University of Alberta

Body Image and Self-Concept in Cree Schoolchildren

by

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ABSTRACT

Weight status, body image and self-concept were examined in Cree children in grades 4 to 6 in Quebec. A body image questionnaire using silhouettes of Aboriginal children and the Piers-Harris Children's Self-Concept Scale (2nd edition) were administered to 105 children. The majority of children were overweight or obese (66.7%) while only one-third (32.4%) were normal weight based on IOTF cut-offs. Body dissatisfaction was found in 84.8% of children, with 74.3% desiring a smaller body size. Heavier children were more likely to desire a smaller body size, to think their body size was 'too big', and to respond 'no' to "I like the way I look now". Although the majority of children (58.8%) had average self-concept, many children (40%) had low self-concept scores. Of those who scored low, 90% desired to be smaller. This study suggests that improving self-concept and body image should be important components of school-based obesity prevention programs for Aboriginal children.

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LIST OF ABBREVIATIONS

ANOVA: Analysis of Variance
BIEQ: Body Image and Eating Questionnaire
BMI: Body Mass Index
BSQ: Body Shape Questionnaire
CDC: Centre for Disease Control
CIHI: Canadian Institute for Health Information
EAT: Eating Attitudes Test
EDI: Eating Disorder Inventory
GDM: Gestational Diabetes Mellitus
FNIHB: First Nations and Inuit Health Branch
INAC: Indian and Northern Affairs Canada
IOTF: International Obesity Task Force
KCAL: Kilocalories
OQ: Overeating Questionnaire
RHS: Regional Longitudinal Health Survey
SPPC: Self-Perception Profile for Children
WHO: World Health Organization

CHAPTER 1: INTRODUCTION

1.1 Rationale

It is well acknowledged that the prevalence of pediatric overweight and obesity are increasing. In addition, pediatric overweight and obesity have been reported in studies of several ethnic groups (Schonfeld-Warden and Warden, 1997). Amongst Canadians, overweight and obesity are thought to occur more frequently in Aboriginal people compared to non-Aboriginal people living both on (First Nations Centre, 2005) and off (Shields, 2005) reserve. Excessive obesity rates in children have been reported in the James Bay Cree of Quebec (Bernard, Lavallee, Gray-Donald, and Delisle, 1995), the Oji-Cree in Sandy Lake Ontario (Hanley et al., 2000), and in the Mohawk community of Kahnawake (Trifonopoulos, 1995). Furthermore, rates of overweight and obesity have been increasing in Aboriginal populations. Among the James Bay Cree of northern Quebec, who are the focus of this study, 24% of schoolchildren aged 6 to 12 years were deemed overweight (defined by > 85 and < 95th Body Mass Index [BMI] percentile) and 35% were obese (> 95th percentile) (Ngnie Teta, 2002). In comparison, Cree children 60 years ago presented with significantly lower rates of overweight and obesity at < 5% and 2%, respectively (Ngnie Teta, 2002).

In First Nation adults, serious health complications of obesity including type 2 diabetes mellitus, uncommon 50 years ago, have surfaced as a major health concern (Macaulay et al., 1997). This has prompted research on the determinants and outcomes of obesity in Aboriginal communities. While concerns with obesity associated complications such as diabetes and cardiovascular disease have been widely recognized, it has become even more noteworthy now as complications surface among adolescents and children (Dean, Mundy, and Moffatt, 1992; Dean, Young, Flett, and Wood-Steiman, 1998; Gilbert, Percy, Sugarman, Benson, and Percy, 1992). Bearing in mind the potential physiological consequences, one should not neglect that overweight and obesity also threatens an individual's psychological health.

Although undocumented in Cree in northern Quebec, there is evidence that overweight and obesity has a psychological impact. It is commonly thought that overweight or obesity and self-concept share an inverse relationship, yet the literature is inconsistent. Current literature suggests that Aboriginal youth exhibit body image concerns and participate in unhealthful weight loss attempts. Several authors have noted Aboriginal youth to be as concerned about their weight as other youth, and eating disturbances to be more prevalent in Aboriginal children when compared to other ethnic groups and Caucasians (Marchessault, 1999, 2004; Smith and Krejci, 1991). This contradicts the thought that Aboriginal people are less concerned about their weight and idealize larger body shapes and sizes, as reported in the Ojibway Cree (Gittelsohn et al., 1996). It suggests that Aboriginal youth demonstrate some degree of acculturation by internalizing messages from the Western culture.

Given the potential psychological impact of obesity, it is imperative that obesity prevention programs encourage children to develop a positive body image and self-concept. To do this, there must be a thorough understanding of the psychosocial factors that arise from overweight among Aboriginal children. There is a current gap in knowledge on children's self-concepts and perceptions of their own body size. Whether Aboriginal youth in northern Quebec are protected by ethnicity, culture, gender, and geographic location are questions that remain to be answered. The following outlines a study of Cree children in northern Quebec that examined body image and self-concept in all weight categories.

1.2 A Health Promotion Perspective

From a health promotion perspective, health is a multidimensional concept, going beyond the mere absence of disease or matters of lifestyle and behavior. It "has to do with the bodily, mental, and social quality of life of people as determined in particular by psychological, societal, cultural and policy dimensions" (Rootman and Raeburn, 1994, p.69). Health promotion embodies the World Health Organization's (WHO) definition of health as "a resource for everyday life, not the objective of living" (1986, p.1). Similarly, First Nations people embody a holistic view of health, in that it involves the balancing of the physical, mental, emotional and spiritual well being (National Aboriginal Health Organization [NAHO], 2005).

From a health promotion perspective, achieving health depends on both individual and collective conditions that can influence health status. These are called the determinants of health, of which twelve are discussed most frequently including: income and social status, social support networks, education, employment and working conditions, social environments, personal health practices and coping skills, healthy child development, biology and genetic endowment, health services, gender, and finally culture (Health Canada, 2006). The most influential determinant on health is income and social status (Health Canada, 2001). As income and social hierarchy increase, health status improves (Health Canada, 2001). Even people's perceptions of how healthy they are, are linked with their income levels (Federal, Provincial and Territorial Advisory Committee on Population Health, 1994).

1.2.1 Aboriginal People

In Canada, Aboriginal people have significantly lower health status than non-Aboriginal peoples (Federal, Provincial and Territorial Advisory Committee on Population Health, 1994). Low income, low socio-economic status, lack of education and other unfavorable living conditions are major contributors to poor health (Federal, provincial and Territorial Advisory Committee on Population Health, 1994). According to the *Urban Poverty in Canada* report (Lee, 2000) over half (55.6%) of urban Aboriginal people were living in poverty compared to 24% of non-Aboriginal people. Although injury and poisoning are the leading causes of death (First Nations and Inuit Health Branch [FNIHB], 2003) it might be anticipated that obesity related morbidities will rise as a result of increasing rates of obesity and diabetes (Canadian Institute for Health Information [CIHI], 2004).

1.2.1.1 Environmental Influences on Aboriginal Health

1.2.1.1.1 Obesity

While genetics may play a role in creating a greater propensity towards excess adiposity among Aboriginal people, environmental factors appear to be the larger reason for recent increases in overweight and obesity (Story et al., 1999). Grocery stores or other food vendors allow for the introduction of energy dense market foods into these communities and reduce the need for hunting and gathering. In addition, some communities are only accessible by air and therefore goods including food must be transported by plane. As a result, there is an increased price for food, driving the cost of healthy eating upwards. Lack of access to traditional foods and dependence on market foods have been suggested to contribute to the increasing rates of obesity and type 2 diabetes among Aboriginal people (Willows, 2005). Furthermore, technological advances such as television, computer games, and cars reduce the amount of physical activity endured daily. These environmental changes have created behavioral and lifestyle conditions that promote overweight and obesity including increased sendentariness, reduced traditional food acquisition practices and consumption of high-fat market foods (Story et al., 1999). In a study by Ravussin et al. (as cited in Story et al., 1999), obesity and diabetes were less prevalent among American Indians living a more traditional lifestyle. It appears that behavioral and lifestyle practices from the dominant Western society have replaced more traditional lifestyles.

1.2.1.1.2 Body Image

Once known to be health issues afflicting middle-class Caucasian females, body dissatisfaction, unhealthy weight loss attempts and eating disturbances have been noted among Aboriginal people as well. Aboriginal culture was presumed to be protective against the unrealistic Western ideals of body weight and shape. Culture however is developed not only from "personal history [but] wider situational, social, political, geographic and economic factors" (Health Canada, 2001). Therefore, for Aboriginal people living in North America today, it may be difficult to preserve traditional culture. Even Aboriginal people who reside in rural and remote areas receive messages from the mainstream society through forms of mass media including television that can influence their beliefs, attitudes, and behaviors.

The sociocultural environment shapes people's perceptions of food and weight. According to Irving and Neumark-Sztainer (2002), "obesity, eating disorders, and unhealthy weight loss practices are cultivated in the same cultural context - an increasingly 'toxic' environment regarding food and weight" (p.299). In Western cultures, emphasis is placed on valuing thinner body types, the stigmatization of obesity, consumption of energy-dense foods, and dieting (Irving and Neumark-Sztainer, 2002). Those who are most vulnerable to this 'toxic' environment are children and adolescents who may internalize these messages more than adults may. Consequently, overweight children have poorer body image, greater body dissatisfaction and are less likely to engage in health promoting behaviors than children who are not overweight (Neumark-Sztainer, Story, Resnick, and Blum, 1997). In fact, childhood obesity may carry adverse social consequences such as negative effects on self-esteem, body image, and economic mobility (Dietz, 1998). As a result, healthy child development is compromised.

1.2.1.2 Aboriginal Youth

According to the *Preliminary Findings of the First Nations Regional Longitudinal Health Survey (RHS) 2002-03 Children's Survey* (First Nations Centre, 2005), for children living on reserves, only 41.5% were normal or underweight. This indicates that more than half of children living on reserves are overweight or obese. This poses a significant problem with regards to the health of Aboriginal children, particularly those on reserve. The geographic isolation of reserves may reduce access to health services, hospitals, and education resulting in poorer health outcomes (Jenkins et al., 2003). In addition, it is plausible that the negative consequences of Westernization have permeated to rural and remote Aboriginal communities within North America and that the majority of children are therefore at risk for poor physical, mental and social development.

Early childhood experiences can have powerful effects on health in later life, well-being, coping skills and competence (Health Canada, 2001). As a result, poor health practices early in life may carry through to adulthood. The transition from childhood to adolescence has been noted to be one of the key stages in life that yields the greatest potential to positively influence their health and well-being later in life (Federal, Provincial and Territorial Advisory Committee on Population Health, 1994). Therefore, this transition period represents an important opportunity for children to learn and develop health promoting behaviors.

In order to develop successful interventions to prevent obesity, a range of health promotion strategies should be used to encourage optimal growth and development in childhood and adolescence while promoting healthy perceptions of eating and weight. The Ottawa Charter identifies five health promotion strategies including: building healthy public policy, creating supportive environments, strengthening community action, developing personal skills, and reorienting health services (WHO, 1986). Among health promotion practitioners who perceive health holistically, the physical, mental, emotional and spiritual aspects must be considered in developing interventions. As important, is the cultural context in which the issue is situated (Willows, 2004). By creating partnerships with Aboriginal communities, health promotion practitioners can ensure preservation of language, history, traditions, and preferences in the development and implementation of intervention programs (Story et al., 1999).

1.3 Purpose

The Cree of northern Quebec may have a cultural ideal for larger body sizes (Adelson, 2000). In addition, the community in which this study took place is rural, which may protect children from the messages about thinness of the Western society (Davis and Lambert, 2000). Poor body image and the desire to be thinner may be a sign of acculturation. Individuals who are unhappy with their bodies may also exhibit lower self-esteem. Overweight or underweight children may be at risk for poor body image and low self-concept compared to normal weight children. The purpose of the study was to explore body image and self-concept in relationship to weight status among Cree schoolchildren in grades 4 to 6 in northern Quebec.

1.4 Research Questions

(1) What is the prevalence of overweight and obesity among Cree children?

(2) Is body dissatisfaction present in Cree children and if so, what is the magnitude and direction of body dissatisfaction among Cree boys and girls?

(3) What is the perceived ideal body size among Cree boys and girls?

(4) Do Cree children perceive their own body sizes as accurately as an external rater?

(5) Do Cree schoolchildren understand the relationship between diabetes and weight?

(6) What is the level of self-concept among Cree children?

(7) Do obese Cree youth (obesity measured using BMI) have lower scores for self-concept and on the physical appearance and attributes domain in the Piers-Harris Children's Self-Concept Scale (2nd edition) compared to their non-obese counterparts?

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CHAPTER 2: LITERATURE REVIEW

2.1 Aboriginal People

"Aboriginal people" is a collective term referring to the original inhabitants of North America and their descendants (Communications Branch, Indian and Northern Affairs Canada [INAC], 2002). There are many different Aboriginal peoples having distinct cultures, heritage, language, and beliefs (Communications Branch, INAC, 2002). There are three distinct groups of Aboriginal people recognized in section 35 of the *Constitution Act* of 1982 of Canada: North American Indian, Inuit and Métis (Communications Branch, INAC, 2002). "First Nations" has now commonly replaced the term "Indian" and refers to both Status and Non-Status Indians in Canada (Communications Branch, INAC, 2002).

First Nations make up 62% of Canada's Aboriginal peoples and include approximately 50 culturally and linguistically distinct groups living in 600 First Nations communities (CIHI, 2004). The Cree are one of these distinct groups of First Nations people that reside throughout much of Canada. "Inuit" are Aboriginal people who reside primarily in 55 communities in Nunavut, the Northwest Territories, and the northern parts of Labrador and Quebec (CIHI, 2004; Communications Branch, INAC, 2002). According to the 2001 census, Inuit make up approximately 5% of the Aboriginal peoples in Canada (CIHI, 2004). "Métis" refer to those individuals with mixed First Nations and European ancestry (Communications Branch, INAC, 2002). According to the 2001 census, Métis make up approximately 30% of Aboriginal peoples in Canada (CIHI, 2004).

2.1.1 Health of Aboriginal People

Large health disparities exist within Canada particularly in comparison of Aboriginal and non-Aboriginal peoples. Life expectancy, among other health indicators, remains worse among Aboriginal peoples than Canadians as a whole (CIHI, 2004). Despite life expectancy of First Nations rising in 2000 to 68.9 years for males and 76.6 years for females, it remains lower than that of the general Canadian population (76.3 and 81.2 years for males and females respectively) (FNIHB, 2003). Although injury and poisoning were found as the leading causes of death, there is legitimate concern over the increasing rates of chronic disease (FNIHB, 2003).

Aboriginal peoples are experiencing high rates of type 2 diabetes and obesity. First Nations people exceed non-Aboriginal Canadians in rates of overweight and obesity, with the former having rates of 69% and the latter 46% (CIHI, 2004). Furthermore, prevalence of diabetes is 3% in Canadian males, and 3% in Canadian females while among First Nations people, it is 11% in males and 17% in females (CIHI, 2004). Although death due to endocrine disorders decreased from 1991 to 1993 among First Nations people, diabetes accounted for 77.8% of deaths in this area (FNIHB, 2003).

Even subjective ratings of health have been found to be poorer among Aboriginal compared to non-Aboriginal people. According to *Healthy Canadians: A Federal Report on Comparable Health Indicators in 2002*, 61.4% of Canadians surveyed reported their health as ‘very good’ to ‘excellent’ compared to only 38% of on-reserve First Nations surveyed in 2002 (Health Canada, 2002).

2.1.2 Diabetes

Almost unheard of 50 years ago, type 2 diabetes has surfaced as a major health concern for First Nations people. Prevalence of diabetes among First Nations is three times the Canadian average, with higher rates for those living on-reserve (Health Canada, 2000). Information about diabetes prevalence was collected through the *Aboriginal Peoples Survey* (1991) which may have underestimated the true prevalence due to its reliance on self-reported data and the potential that some Canadian reserves were overlooked.

While true prevalence rates of type 2 diabetes among Aboriginal peoples in Canada are to be established, it is clear that this disease, typically of adult onset, has now become a pertinent concern among First Nations youth. Among schoolchildren aged 10 to 19 years old, prevalence rates were approximately 4% in northern Objiwa-Cree populations (Dean et al., 1998). Of those children who were newly diagnosed, 15% were younger than 10 years of age and overweight or obesity were present among these children (Dean et al., 1998). Information about rates of type 2 diabetes in First Nations children in other regions of Canada is not available; however, based on the high prevalence of obesity reported for these children, it might be anticipated that the disease is present in children.

Gestational diabetes mellitus (GDM) is another concern among Aboriginal peoples. Rodrigues, Robinson, Ghezzo, and Gray-Donald (1999), found that maternal overweight was a risk factor for gestational diabetes and that the risk was higher among Aboriginal women compared to non-Aboriginal women. GDM also places the unborn fetus at risk. Infants born to women with GDM are predisposed to macrosomia, which is excessively high body weight (Brennand, Dannenbaum and Willows, 2005). Both high birth weight and low birth weight babies are reported to be at higher risk for the development of type 2 diabetes later in life (FNIHB, 2003).

It is known that family history is a risk factor for type 2 diabetes and with increasing prevalence rates of the disease, diabetes has become a prominent concern of Aboriginal communities. With increasing rates of obesity, there is legitimate concern that Aboriginal communities are at risk for a diabetes epidemic. With the associated complications such as heart disease, stroke, renal failure, neuropathy, and retinopathy, it is imperative that actions be taken toward promoting healthier lifestyles and preventing obesity in children (Health Canada, 2000).

2.2 Obesity

2.2.1 Defining Overweight and Obesity

Body mass index (BMI) has been commonly used to identify an individual's weight status. BMI is a simple but reliable anthropometric measurement to determine adiposity (Lindsay et al., 2001). It is calculated by taking body mass in kilograms and dividing by height in metres squared (weight (kg) / height (m^2)). Among adults, overweight is defined as a BMI 25 to 29.9 and obesity is defined as a BMI of greater than 29.9. BMI is a useful health indicator as associations between increasing BMI and increasing risk for morbidity and mortality have been noted (Dietz, 1998).

The simple BMI-based weight classifications used for adults would be inappropriate for use among growing children. For children, BMI changes with age so the United States Centre for Disease Control (CDC) growth charts have been adjusted for age and classify underweight and overweight by percentiles. Accordingly children are considered overweight if BMI is > 95th percentile and at risk for overweight if BMI is > 85th percentile and < 95th percentile for their age. These growth charts are gender specific and available for use in children aged 2 to 20 years. While charts are considered appropriate for children that were either breast or formula-fed, and for all racial and ethnic groups in the United States, insufficient data were collected for ethnic- or racial- specific growth charts (CDC, 2002).

Cole, Bellizzi, Flegal, and Dietz (2000) have criticized the use of American data represented in the CDC growth charts for use internationally. A more international definition of overweight and obesity in pediatric populations was therefore developed by Cole et al. (2000) by compiling six large nationally representative cross sectional surveys. Surveys on growth were collected from Brazil, Great Britain, Hong Kong, the Netherlands, Singapore, and United States. Consequently, the International Obesity Task Force (IOTF) Cut-Offs are appropriate for use for population comparisons (Cole et al., 2000). Centiles were created from the pooled data sets and cutoffs were determined by extrapolating adult BMI definitions of overweight as > 25 and obese as > 29.9. BMI standards for children 2 to 18 years of age are therefore linked with the adult overweight and obesity cutoffs.

2.2.2 Pediatric Overweight and Obesity in Canada

It is well acknowledged that the prevalence of pediatric overweight and obesity is increasing. In examining the likelihood of obesity to persist through the lifespan, there is a greater risk for obese children to become obese adults (Lohman, 1987; Epstein, Wing, Koeske, and Valoski, 1987). Surveys that measured children's heights and weights indicate that overweight and obesity in children is increasing. The *1978/79 Canadian*

Health Survey (CHS) reported that for children aged 2 to 17 years of age, 15% were overweight (12%) or obese (3%). In comparison, the *2004 Canadian Community Health Survey (CCHS)* reported that among children aged 2 to 17 years of age that 26% were overweight (18%) or obese (8%) based on the IOTF cut-offs. Therefore, over the past 25 years, overweight and obesity has nearly doubled and obesity rates have nearly tripled (Shields, 2005). Moreover, pediatric obesity has been reported in studies of several ethnic groups (Schonfeld-Warden and Warden, 1997).

2.2.3 Overweight and Obesity among Aboriginal People

Amongst Canadians, overweight is thought to occur more frequently in Aboriginal people. According to the report, *Improving the Health of Canadians* (CIHI, 2004), rates of overweight and obesity among Aboriginal peoples were 35% and 24% respectively compared to non-Aboriginal Canadians where rates were 32% and 14% respectively. It should be noted that the true prevalence rate of obesity and other health indicators is unknown as there is no national database and data collection may not represent all Aboriginal peoples due to the possible omission of some reserves. Excessive obesity rates, however, have also been documented and reported in several Canadian communities including the James Bay Cree of Quebec (Bernard et al., 1995), the Oji-Cree in Sandy Lake Ontario (Hanley et al., 2000), and the Mohawk community of Kahnawake (Trifonopoulos, 1995). Obesity is a serious health problem particularly among Aboriginal people as rates of non-insulin dependent diabetes have been increasing in these populations over the past 50 years. It is particularly distressing as obesity associated complications including diabetes, hyperlipidemia, and high blood pressure are now being documented in children and adolescents (Freedman, Dietz, Srinivasan, and Berenson, 1999).

Among children, rates of overweight and obesity are profound. Compared to Canadian children in general, where 26.2% were reported to be overweight or obese (Shields, 2005), among Aboriginal children living on reserves, over half (55.2%) were either overweight or obese according to the *First Nations Regional Longitudinal Health Survey 2002-2003* (First Nations Centre, 2005). More specifically, 22.3 % of children were found to be overweight, and 36.2% were found to be obese. Researchers have reported similar rates in Aboriginal children living off-reserve (Shields, 2005). Among the James Bay Cree in northern Quebec, it was found that 24% of schoolchildren aged 6 to 12 years were overweight (defined by > 85 and < 95th percentile) and 35% were obese (> 95th percentile) (Ngnie Teta, 2002). In Kahnawake, Quebec, 31.2% of children aged 5 to 12 years of age, or 29.6% of boys and 32.8% of girls were found to be overweight based on BMI > 85th percentile (Trifonopoulos, 1995). Similarly, 27.7% of boys and 33.7% of girls aged 2 to 19 years of age living in the Oji-Cree community of Sandy Lake in Northern Ontario were found to be overweight (Hanley et al., 2000). From existing data, it is obvious that overweight in Aboriginal children is not only present, but prevalent and there is legitimate concern over the health and welfare of these children, and as they grow older.

2.2.3.1 Lifestyle Changes

Disruptions to their traditional ways of life have impacted the well-being of Aboriginal peoples and may be directly related to the increasing prevalence of obesity in the nation. For example, prior to the late 1970s the Cree in Quebec were hunters, fishers, and trappers; however since then, disruptions to their traditional culture have included the introduction of market food and settlement in villages. The impact this had on the Cree was a marked decrease in physical activity and of course, changes in dietary intake – a dramatic lifestyle change that has impacted the health of the people (Adelson, 2000).

While many Aboriginal peoples view traditional foods as health promoting, access to these foods has been problematic for economic and environmental reasons (Willows, 2005). As a result, people consume the less expensive, more accessible and less nutritious market foods. Among Baffin Inuit, market foods have been found to contribute to 84% of children's dietary energy intake while traditional foods contribute to 16% of energy intake (Berti, Hamilton, Receveur, and Kuhnlein, 1999). Energy intakes are greater among Mohawk children compared to American children by approximately 236 kcal/day (Harvery-Berino et al., 1997). Movement away from traditional foods to market foods may be one important factor contributing to the high rates of obesity in Aboriginal children.

Supermarkets, convenience stores, and fast food restaurants eliminate the need to utilize traditional methods to obtain foods including hunting, fishing and trapping thereby promoting sedentary lifestyles. Present day technologies also encourage sedentariness. Television watching, surfing the internet, and playing video games are largely practiced by children. Cree children in Northern Quebec reported an average of 13 hours per week viewing television but only reported an average of 2.7 bouts of exercise (of at least 30 minutes) per week (Bernard et al., 1995). Furthermore, overweight children reported less physical activity (2.1 times versus 3.1 times per week) and watched more television (14.2 hours versus 11.6 hours) compared to their non-overweight counterparts (Bernard et al., 1995). The combination of reduced physical activity and consumption of energy dense, high-fat diets are likely significant contributors to the rising obesity epidemic among Aboriginal peoples.

2.3 Body Image

Body image has been defined as "the internal representation of your own outer appearance - your own unique perception of your body" (Thompson, Heinberg, Altabe, and Tantleff-Dunn, 1999, p.4). Health Canada (2003) more specifically defines body image as "the feelings, attitudes and perceptions of the body, based on social norms, body experiences and individual attitudes about body weight and shape" (p.3). In essence, body image is determined by the individual; how they think and perceive their own body to be.

With Western society's acceptance of thinness as an ideal and desirable body type, poor body image is becoming increasingly common. Fear of fatness and weight preoccupation seems ubiquitous in the North American culture and is not limited to adults. Among adolescents feeling too fat and wanting to weigh less is becoming normative (Koff and Rierdan, 1991). Even young girls in the third and fifth grades have been reported to adopt the values of thinness (Kater, Rohwer, and Levine, 2000). As a result, it is common to see young boys and girls reporting body size and shape dissatisfaction. Studies have reported 43 to 56% of girls in ninth through twelfth grades consider themselves as being fat, and 63 to 70% wanting to lose weight when only 25% would be classified as overweight by national standards (Koff and Rierdan, 1991). Drastic weight control strategies including fasting, vomiting, diet pills, laxatives and diuretics are used frequently among adolescent girls indicating high rates of sub-clinical cases of eating disorders (Koff and Rierdan, 1991). Preoccupations with weight and using unhealthy methods to control weight place individuals at physical and psychological risk, particularly among adolescents whose bodies are still undergoing change. Consequently, normal growth and development are jeopardized in hopes of meeting societal standards of beauty.

2.3.1 Body Image and Ethnicity

Ethnic differences in body size and shape desirability have been noted. In cultures that value larger body sizes or that do not stigmatize obesity as profoundly, the likelihood of overweight yielding low self-esteem or severe weight control behaviors may not hold true. Size or weight acceptance refers to "accepting the full range of body sizes and weights without bias" (p.3) and not endorsing weight control methods (Health Canada, 2003). For example, for a black woman the experience of being overweight is a much less negative experience than for a white woman (Jeffrey et al., 1989). African American girls and women report being less dissatisfied with their weight despite the tendency for them to be heavier than Caucasians (Thomas, 1989; Fisher, Pastore, Schneider, Pegler, and Napolitano, 1994). In addition, black women select ideal body sizes that are larger and more harmonious with their current perceived size (Rucker and Cash, 1990). Powell and Kahn (1995) suggest that a heavier cultural body size ideal may serve to protect black women from stringent goals for body weight. Moreover, it is suggested that the culturally driven acceptance of larger body sizes by older black women could serve as motivation for black adolescents to view or perceive being overweight as acceptable and not negative.

Among Hispanics, surveys indicate that they are heavier, exercise less, are less concerned about weight and are more likely to rate themselves as attractive and report more positive attitudes towards obesity than Caucasians (Crago, Shisslak, and Estes, 1996; Franko and Herrera, 1997). In Asians, results have been inconsistent. Some studies have found that Asian women have less body dissatisfaction than white women do while other studies have found that weight concerns between the two groups are similar with Asians having a greater fear of fatness (Cachelin, Rebeck, Chung, and Pelayo, 2002). The level of acculturation of an ethnic group should be considered as social and cultural influences can play an important role in the perceptual development of acceptable body shapes and sizes.

2.3.2 Weight Perceptions and Body Image in Aboriginal People

Literature on Aboriginal people has also shown a greater acceptance for larger body sizes and shapes in some communities. Some reports show that Aboriginal peoples have a tendency to prefer relatively larger body shapes with heaviness as a sign of health and as the ideal of attractiveness (Gittelsohn et al., 1996; Marchessault, 1998, 2004). In some communities, fat in food is seen as nourishing and extra weight on an individual is interpreted as a sign of robustness and strength (Willows, 2003). Gittelsohn et al. (1996) found that the Ojibway-Cree in Northern Ontario tended to prefer larger body shapes compared to the Anglo populations. It may be that heaviness is desirable to First Nations elders as they associate thinness with disease due to their experiences with such illnesses as tuberculosis (Gittelsohn et al., 1996). In addition, physical health is not the sole determinant of health. In Cree communities in Quebec, Adelson (2000) reported that health is viewed holistically so that physical, mental, emotional and social aspects contribute to overall health status. For these reasons, overweight may not be recognized as a health concern among First Nation's communities.

This view that heaviness is not a concern however is not always shared by Aboriginal youth. In fact, some studies have shown that Aboriginal youth indicated that heaviness was not always healthy and were able to make associations between heaviness and disease. Rinderknecht and Smith (2002) asked urban Native American youth to identify the healthiest figure using a silhouette scale adapted from Stevens et al. (1999). With figures ranging from one to eight (one being the thinnest and eight being the largest), the median response was four. Youth were also asked to identify which figure was most at risk for developing diabetes. Most (60% of boys and 51% of girls) chose the largest figure suggesting that the majority were aware that obesity poses a risk for the development of diabetes. This data indicates that most youth are able to select a reasonable body size as healthy.

There is literature to suggest that Aboriginal youth are dissatisfied with their bodies and express a desire to be thinner. Several authors have noted Aboriginal youth to be as concerned about their weight as other youth and eating disturbances to be more prevalent in Aboriginal children when compared to other ethnic groups and Caucasians (Marchessault, 1999, 2004; Smith and Krejci, 1991). Among Southwestern American Indian preadolescent children ages 9 to 13, only 31.1% of girls reported being satisfied with their bodies (Davis and Lambert, 2000). Girls identified a thinner self as ideal; as BMI increased, the discrepancy between desired and current perceived figure increased. Further, it was reported that 61% of all students and 82% of overweight students had attempted to lose weight. In a study by Story et al. (1994) among American Indian and Alaska Native youth, 41% of girls reported feeling overweight, 50% were unhappy with their weight, and 44% were concerned about being overweight. Nearly half (48%) engaged in weight loss practices over the last year. Rinderknecht and Smith (2002) studied urban Native American youth aged 5 to 18 and found that younger children selected thinner ideal body figures than adolescents with 61% of boys and 41% of girls wanting to be thinner. Aboriginal youth therefore appear to be dissatisfied with their own bodies, a possible effect of adopting the Western ideal for thinner body types.

Individuals with a drive for thinness are at risk for developing disordered eating patterns. In a study of urban American Indian women, 10% of women practiced binge eating (Sherwood, Harnack, and Story, 2000). Most of these women who acknowledged binge eating were overweight and most engaged in using one unhealthful weight loss strategy including laxative abuse, fasting, self-induced vomiting, or diet pill use. Such weight concerns and weight control methods have also been reported in adolescents. Among American Indian and Alaska Native adolescents, it was reported that 78% engaged in a weight-loss diet (48% of girls, 30% of boys), 35% had a fear of uncontrolled eating (23% of girls, 12% of boys), and 39% used self-induced vomiting (27% of girls, 12% of boys) (Story et al., 1994). Thus, disordered eating afflicts both Aboriginal adults and youth; disordered eating in youth is particularly concerning as youth may be jeopardizing growth to obtain a thinner body.

It is noteworthy to point out that girls appear to be more dissatisfied with their weight than boys. Gender differences (in body weight dissatisfaction) are not surprising considering the societal ideal for females to be thin. Among American Indian youth, girls were twice as likely to be told that they were too fat (Davis and Lambert, 2000). Girls also selected thinner figures than boys for best-looking male and female. In American Indian and Alaska Native adolescents, 68% of boys were satisfied with their weight compared to 50% of girls (Story et al., 1994). Similarly, Stevens et al. (1999) found 48% of girls and 34% of boys wanting to be thinner. While not immune to cultural ideals of thinness, boys appear to be at lower risk for developing poor body image.

2.3.3 Measures of Body Image

2.3.3.1 Silhouettes

Silhouettes have often been used to measure body satisfaction or assess body image. Typically, the silhouettes are arranged from thinnest to largest and contain a discrete number of figures. The most commonly employed are those figures developed by Stunkard, Sorensen, and Schulsinger (1983) which illustrate nine females and nine males from very thin to very obese. Respondents are asked to choose the figure that they believe represents their own body size, and the figure that they think represents their ideal body size. The discrepancy between the two figures selected is used as a measure of body dissatisfaction.

Although the adult figures such as those by Stunkard et al. (1983) have been widely used, researchers recognize adult figures to be inappropriate for use in children (Sherman, Iacono and Donnelly, 1995). Tiggemann and Pennington (1990) suggest that children and adolescents would have difficulty selecting their own body size using adult scales and therefore, created more age-appropriate drawings for adolescents and children. Collins (1991) also designed a new children's scale in response to the growing need for more age appropriate scales, depicting seven males and seven females from very thin to very obese, based on the figure drawings by Stunkard et al. (1983). Other body image assessment tools with childlike silhouettes include those by Childress, Brewerton, Hodges, and Jarrell (1993), Sherman et al. (1995) and Vernon-Guidry and Williamson (1996). With body dissatisfaction becoming prevalent in younger children it is important to employ age-appropriate scales.

Many figure scales represent Caucasian males and females but have been frequently used among different ethnic groups. "Differences in perceived body size are difficult to assess with culturally insensitive measurement scales" (Patt, Lane, Finney, Yanek, and Becker, 2002, p.54). This has prompted researchers to develop more appropriate scales, including Anderson, Janes, Zeimer, and Phillips (1997) and Patt et al. (2002) who developed scales for adult black women. Stevens et al. (1999) developed figures of Aboriginal adolescents.

Pictorial body figure rating scales are simple and quick to administer. Visual images are less abstract, require less verbal fluency and are easy to comprehend compared to questionnaires, which make them ideal for use in children (Truby and Paxton, 2002). Many scales however, are not linked to actual body mass index and validity and reliability have not been adequately assessed.

2.3.3.1.1 Reliability and Validity of Silhouette Scales

Validity is the degree to which a tool measures what it is supposed to measure (Pallant, 2005, p.6). Content validity "refers to the adequacy with which a measure or scale has sampled from the intended universe or domain of content". Construct validity "involves testing a scale not against a single criterion but in terms of theoretically derived hypotheses concerning the nature of the underlying variable or construct" (Pallant, 2005, p.6).

"Reliability of a scale indicates how free it is from random error" (Pallant, 2005, p.5). Both test-retest reliability and internal consistency have been used as markers of reliability. Test-retest involves the administration of a scale twice to the same subject at two different points in time. The results from the two tests are then correlated, with higher correlations indicating good test-retest reliability. Internal consistency is "the degree to which the items that make up the scale are all measuring the same underlying attribute" (Pallant, 2005, p.5). Cronbach's coefficient alpha, which provides an average correlation among the items in the scale, ranges from 0 to 1 with higher scores indicating better reliability.

Among adults and adolescents, pictorial scales have been shown to be valid and reliable for actual body size (Candy and Fee, 1998; Cohn et al., 1987; Sherman et al., 1995) and body image satisfaction (Sherman et al., 1995; Thompson and Altabe, 1991). Thompson and Altabe (1991) found among subjects 16 to 25 years of age, test-retest correlations for ideal body size to be 0.71 for females and 0.82 for males, and for perceived body size to be 0.89 for females and 0.92 for males. Correlations for validity between figure ratings, measures of body dissatisfaction and eating disturbances were also significant ($p < 0.1$ to $p < 0.001$) (Thompson and Altabe, 1991).

Among the pictorial scales for children, Collins (1991) has evaluated the test-retest reliability and criterion validity of a scale with seven silhouettes of prepubescent girls and boys in subjects in grades 1 to 3. Good reliability was found for the figure selected as perceived actual size ($r = 0.71$) while the correlation was slightly lower for the figure selected as ideal ($r = 0.59$). In terms of validity, Collins (1991) found that those who reported wanting to lose weight selected an ideal figure size smaller than that perceived as their actual more often than those who did not want to lose weight. Furthermore, a small but significant correlation was noted between perceived figure size and BMI ($r = 0.37$; $p < 0.05$) (Collins, 1991). Validity and reliability for pictorial scales in older children remains to be established, however it appears that pictorial rating scales are appropriate for use in children.

2.3.3.2 Questionnaires

Questionnaires for adults have been used to assess body satisfaction particularly those that aim to assess eating disturbances. The Eating Disorder Inventory (EDI), Eating Attitudes Test (EAT) and Body Shape Questionnaire (BSQ) are popular in assessing eating disturbances and have been used in eating disorder research. The EDI is a 64-item self-report tool that assesses the psychological and behavioral traits seen in anorexia nervosa and bulimia (Garner, Olmsted, and Polivy, 1983). The EAT questionnaire is a 26-item questionnaire that measures behaviors and attitudes symptomatic of anorexia nervosa (Garner, Olmsted, Bohr and Garfinkel, 1982). The BSQ is a 34-item questionnaire that measures concerns with body shape and the experience of "feeling fat" (Cooper, Taylor, Cooper, and Fairburn, 1987).

With research among children and adolescents becoming more prevalent, it is questionable whether questionnaires designed for older individuals would be appropriate for children. Thelen, Powell, Lawrence, and Kuhnert (1992) developed the Body Image and Eating Questionnaire for Children (BIEQC) for use in a non-clinical sample of children in grades 2 to 6. The BIEQC contained 14 items involving questions on history of dieting, concerns with the effect of eating food, and concerns about being or becoming overweight (Thelen et al., 1992). Still, it is debatable whether the use of these tools would be appropriate in cultures where such eating and weight disturbances may not exist. From an ethical standpoint, such tools should not be administered if there is the potential to do harm - particularly as children are more impressionable than adults.

2.4 Self-Concept

Self-esteem has often been used as a measure of psychological well-being. Self-esteem is defined as "the awareness of good possessed by the self and represents how positive individuals feel about themselves in general" (Fox, Boutcher, Faulkner, and Biddle, 2000, p.9). Self-perception and self-concept are also terms that have been used interchangeably in the literature to describe psychological well-being. Self-perception is the "umbrella term that denotes all types of self-referring statements about the self ranging from those that have specific content to those that express general feelings" (Fox et al., 2000, p.9). Self-concept is defined as a "stable set of attitudes reflecting both description and evaluation of one's own behavior and attributes" (Piers and Herzberg, 2003, p.3).

2.4.1 Self-Concept and Weight

"Obesity creates an enormous psychological burden" that "may be the greatest adverse affect of obesity" (National Institute of Health, 1985). Subject to discrimination, obese children are at risk for poorer emotional and social development. Heaviness is not only seen as undesirable, but young children perceived obese figures to be lazier, less attractive, less happy, less smart, and less popular (Brylinsky and Moore, 1994; Hill and Silver, 1995; Tiggemann and Wilson-Barrett, 1998). Obese children are also liked less as playmates (Cramer and Steinwert, 1998) and less liked than children with physical handicaps (Richardson, Goodman, Hastorf, and Dornbusch, 1961).

Low self-esteem has been identified as one of the negative psychological consequences of obesity, although it remains controversial whether this occurs ubiquitously. Studies have reported an inverse relationship between BMI and self-esteem (Kaplan and Wadden, 1986; Strauss, 2000; Brown et al., 1998) particularly among children (Friedlander, Larkin, Rosen, Palermo, and Redline, 2003; Davison and Birch, 2002). Hesketh, Wake, and Waters (2004) found that higher BMI predicted lower self-esteem four years later among children 5 to 10 years of age. Compared to normal weight children, Wake, Salmon, Waters, Wright, and Hesketh (2002) found that parents of obese children were twice as likely to report that their child suffered from low self-esteem. Other studies have shown no relationship between obesity and self-esteem. Rather, it is the perception of fatness or negative thoughts and feelings about one's appearance that has been tied to lower self-esteem among children in many studies (Stager and Burke, 1982; Klesges et al., 1992; Mendelson, White, and Mendelson, 1996; Pierce and Wardle, 1993). Erikson, Robinson, Haydel, and Killen (2000) found that among third grade children, concerns with overweight, but not the BMI of subjects, was significantly associated with depressive symptoms. The effects of socioeconomic status, ethnicity, gender, and culture should also be considered as contributors to the development of self-concept.

2.4.2 Self-Concept in Aboriginal People

Limited research exists on the level of self-concept among Aboriginal peoples; however, it would be suspected that marginalized groups would experience lower levels of self-concept compared to non-marginalized groups considering the prejudiced attitudes that exist in society. Lefley (1975) found that among Mikasuki Seminole children, scores for self-concept were below norms for non-Aboriginal children of the same age. Pederson, Walker, and Glass (1999), however, found that Aboriginal-Australians had high self-concept scores. It may be that family or other significant figures offer protection from the wider societal messages (Pedersen and Walker, 2000). This is particularly important in childhood development as parental influence is noted to be most influential until the ages of 11 to 12 years (Golan and Weizman, 2001).

The effect of weight on self-concept among Aboriginal populations has also been looked at sparingly. Neumark-Sztainer et al. (1997) reported only weak associations between weight status and psychosocial concerns for Aboriginal youth in grades 7 to 12. Body weight however was associated with body dissatisfaction, low body pride and weight concerns (Neumark-Sztainer et al., 1997). In this case, self-concept does not appear to be heavily influenced by overweight. This suggests that ethnicity and culture may offer protection from the values and attitudes of the larger society.

2.4.3 Measures of Self-Concept

Self-report questionnaires are commonly used to assess psychological well-being. Instruments cited in the literature for children include: Rosenberg Self-Esteem Scale, Piers-Harris Children's Self-Concept Scale, Self Perception Profile for Children, Coopersmith

Self-Esteem Inventories, Self-Esteem Rating Scale for Children, and the Tennessee Self-Concept Scale.

- Rosenberg's Self-Esteem Scale (Rosenberg, 1965) is a unidimensional measure of global self-esteem intended for use among adolescents. Subjects are required to respond to 10 statements such as, "On the whole, I am satisfied with myself". Responses are on a four point scale from strongly agree to strongly disagree.
- The Piers-Harris Children's Self-Concept Scale originally contained 80-items but has since been revised to a second edition (2003) containing 60 items (Piers and Herzberg, 2003). The Piers-Harris Children's Self-Concept Scale (2nd edition) is deemed appropriate for ages 7-18 years of age and measures six domains which evaluate specific components of self-concept including: behavioral adjustment, intellectual and school status, physical appearance and attributes, freedom from anxiety, popularity, and happiness and satisfaction (Piers and Herzberg, 2003). It also provides an overall self-concept score. In Western cultures, it may be particularly common to see poor overall psychological well being as a result of body image dissatisfaction.
- The Self Perception Profile for Children (SPPC) has been used to measure self-perception in children 8 to 12 years of age (Harter, 1985). It encompasses six domains including global self-worth, physical appearance, athletic competence, behavioral conduct, scholastic competence, and social acceptance.
- Coopersmith (1967) developed an inventory of 58 items to assess attitudes towards one's self for use in children and adolescents aged 8 to 15 years. Specific contexts include peers, parents, school, and personal interest.

- The Self-Esteem Rating Scale for Children (Chiu, 1987) measures self-esteem as rated by teachers and is intended for use in children from kindergarten to grade 9. It contains 12 statements such as “Hesitates to speak up in class” which require teachers to respond on a 5-point scale from never to always.
- The Tennessee Self-Concept Scale (Fitts, 1965 as cited in Chiu, 1988) contains 100 self-descriptive items that measures overall self-worth and several aspects of self-concept for people 12 years of age or older. These include external (moral-ethical, social, personal, physical, and family) and internal (identity, behavior and self-satisfaction) aspects of self-concept.

Although some instruments such as the Self-Esteem Rating Scale for Children require teachers to make direct observations, it would be argued that such methodology would not capture the feelings and attitudes of the self as perceived by the individual. Tools that use self-report to measure self-concept may therefore be more appropriate. Below, the Piers-Harris Children’s Self-Concept Scale (2nd edition) is described in detail, as it was the instrument used with Cree children to measure self-concept. The Piers-Harris Children’s Self-Concept Scale (2nd edition) is a self reported instrument that is age-appropriate for children in grades 2 to 12 and is easy to administer. Testing for global self-concept and physical appearance and attributes domains are highlighted, as these are reported for Cree children.

2.4.3.1 Piers-Harris Children’s Self-Concept Scale

The Piers-Harris Children’s Self-Concept Scale (2nd edition) measures psychological well-being in terms of self-concept in children 7 to 18 years of age. In addition to global self-concept, it features six domains including: behavioral adjustment, intellectual and school status, physical appearance and attributes, freedom from anxiety, popularity, and happiness and satisfaction. The domains reflect that self-concept is a multidimensional concept, in that "children's self-evaluations are characterized not only by a global view of themselves, but also by specific appraisals of various feelings, abilities, and behaviors" (Piers and Herzberg, 2003, p.21).

2.4.3.1.1 Global Self-Concept

Global self-concept has been defined as the reflection of "how an individual feels about all the characteristics that make up his or her person, taking into account, among other things, skills and abilities, interactions with others, and physical self-image" (Piers and Herzberg, 2003, p.37). Children who score within the average range "are reporting a level of general self-esteem that is similar to that of most of the students in the standardization sample", and "usually represent a balanced self-evaluation, with acknowledgment of both positive and negative aspects of the self" (Piers and Herzberg, 2003, p.20). Those who score within the low range may have "serious doubts about their own self-worth" and "are likely to evaluate themselves negatively in several specific areas", such as "being less talented or competent than their peers" (Piers and Herzberg, 2003, p.21). Children who score within the high range "are reporting a strongly positive general self-appraisal", and "are typically confident in their abilities across many domains". These children are likely to be familiar with experiencing success, be motivated, happy, and perceive themselves as likeable and valued (Piers and Herzberg, 2003, p.21).

2.4.3.1.2 Physical Appearance and Attributes Domain

Physical appearance and attributes measures the child's "appraisal of his or her physical appearance, as well as attributes such as leadership and the ability to express ideas" (Piers and Herzberg, 2003, p.25). Scores within the average range indicate "both positive and negative appraisals of their appearance and personal attributes, with the positive evaluations tending to outnumber the negative ones" (Piers and Herzberg, 2003, p.25). Children who score in the low range "are likely to have poor self-esteem in relation to their body image and physical strength" and may feel "that they are unattractive, or they may be bothered by specific aspects of their physical appearance" (Piers and Herzberg, 2003, p.25). Children who score in the above average range "are expressing general satisfaction with their physical appearance" (Piers and Herzberg, 2003, p.25). They may also perceive themselves to be popular, valued, intelligent, physically strong and able to take on leadership roles in sports and games (Piers and Herzberg, 2003, p.25).

2.4.3.1.3 Reliability and Validity

Piers and Herzberg (2003) report good reliability both in terms of internal consistency and test-retest reliability with the Piers-Harris Children's Self-Concept Scale (2nd edition). Alpha coefficients which were indicative of internal consistency, ranged from 0.74 to 0.91 for each of the domains and for overall self-concept (Piers and Herzberg, 2003). Test-retest reliability was not performed; however, previous studies have reported this measure with the original Piers-Harris (1964) for overall self-concept scores. Test-retest correlations ranged between 0.65 in a mixed ethnic population (Platten and Williams, 1979) to 0.96 in subjects with mild articulation disorders (Querry, 1970 as cited in Piers and Herzberg, 2003). Among Aboriginal children, the test-retest reliability coefficient was 0.73 over a 10 week period (Lefley, 1974). Piers and Herzberg (2003) point out that since the revised Piers-Harris Children's Self-Concept Scale and the original version are essentially identical in a psychometric perspective, studies that examined reliability and validity in the original version would be upheld in the revised version.

Piers and Herzberg (2003) also investigated content and construct validity in the Piers-Harris Children's Self-Concept Scale (2nd edition). The original scale included 80 items from which 20 items were removed for the second edition. As determined by a clinical expert, of these 20 items, 16 were removed based on the overlapping of content with retained items. Removal of these items therefore would not result in a loss of content. The remaining four items were removed as they were deemed to assess specific rather than general facets of self-concept. As a result, the new edition even with the loss of 20 items did not threaten the content validity of the Piers-Harris Children's Self-Concept Scale (2nd edition).

In terms of construct validity, a factor analysis determined that there were six factors (and hence, the six domains) which are all distinct, but also interrelated aspects of self-concept. Construct validity was also determined by comparing the original and revised Piers-Harris Children's Self-Concept Scale with other tools that measure personality and behavioral characteristics. One of these tools was the Overeating Questionnaire (OQ), which measures thoughts and attitudes related to obesity. It contains a Body Image scale which correlated to the Physical Appearance and Attributes domain in the revised Piers-Harris tool ($r = 0.43$, $p < 0.005$) (Piers and Herzberg, 2003). The original Piers-Harris Children's Self-Concept Scale was also shown to have moderate to high correlations with other measures of self-concept including the Coopersmith Self-Esteem Inventory with a r = 0.63 (Johnson, Redfield, Miller, and Simpson, 1983) to r = 0.85 (Schauer, 1975, as cited in Piers and Herzberg, 2003), and Harter's Self-Perception Profile for Children with a r=0.68 (using the paper-and-pencil format) to r = 0.73 (using the computerized-administered format) (Simola and Holden, 1992). The use of the test with children with English as a second language has not been examined.

2.4.3.1.4 Ethnicity

The original Piers-Harris Children's Self-Concept Scale used an ethnically homogenous sample whereas the revised version used a standardization sample that was similar to the ethnic composition in the United States Census. Although Piers and Herzberg (2003) claim that the standardization sample in the revised version has sufficiently large sample sizes for meaningful comparisons between African American, Hispanics and Caucasians, such meaningful comparisons are not reliable with the small sample sizes of Asians and Aboriginal peoples. Therefore, caution should be exercised when interpreting results with some minority groups.

Certain children whose ethnicity predisposes them to discrimination or other ongoing stressors that exist in the mainstream culture may produce lower self-concept scores (Piers and Herzberg, 2003). "On the other hand, adequate social support seems to insulate children from at least some of these potentially harmful factors" (Piers and Herzberg, 2003, p.45). In addition, cultural response styles may also influence results (Piers and Herzberg, 2003). That is, those who believe it is inappropriate to make positive remarks about themselves may cause spuriously low scores. On the other hand, for those who believe that it is inappropriate to disclose negative thoughts or emotions scores may be spuriously high (Piers and Herzberg, 2003).

2.5 Conclusion

Pediatric overweight is a growing concern among Aboriginal peoples as rates of type 2 diabetes continue to climb. Most notable are the alarming findings of type 2 diabetes in Canadian Aboriginal children. While obesity prevention programs are gaining in popularity, it is important to recognize that the application of such programs in Aboriginal communities may be limited due to the unique ethnic and cultural values that are central to Aboriginal peoples.

Cultural differences may exist with respect to ideal body types or acceptable weights. Previous notions that Aboriginal people, particularly those who live in remote or rural settings prefer heavier body types or that excess weight is seen as a positive attribute indicative of strength and nourishment, is debatable. Current literature suggests that regardless of locality (urban or rural), concerns over body image among Aboriginal youth are present. The extent to which body dissatisfaction or poor body image affect emotional and physical health have been poorly studied among Aboriginal people. Feelings of overweight or poor body image can contribute to the development of low self-concept and may even lead to drastic weight loss attempts and disordered eating. This suggests that perceptions and acceptance of body size which are variable among ethnic groups, are shaped by both home and host culture.

Weight loss attempts such as binging, purging or laxative abuse have not been studied in rural Aboriginal communities in Canada. There are gaps in our current knowledge regarding body image and self-concept among Aboriginal youth in remote or rural settings. It is therefore essential to work with community members to gain further information and understanding about the attitudes, beliefs, behaviours, feelings and thoughts of children on body image and self-concept before developing strategies to reduce pediatric overweight. This study will contribute to health promotion efforts that target childhood obesity while promoting healthy child development, and enhancing personal health practices and coping skills.

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CHAPTER 3: METHODS

3.1 Community Setting

There are approximately 13 000 Cree residing in nine communities (five coastal, four inland) in the James Bay Cree territory (www.creeculture.ca). The Cree of northern Quebec refer to themselves as Eeyou which means "the people" and historically have been known to be hunters, fishers, and trappers (www.creeculture.ca). Among their values are respect for the land, the family, the Creator, and the Cree language and culture (www.creeculture.ca).

The current study was part of a larger multifactorial school-based study entitled the Emiyuu Ayayaachiit Awaash Project or The Active Kids Project, which was given its name by community members to describe a study of Cree children's diet, fitness, activity level, weight status, body image and self-concept. The participating community was a rural Cree village located in northern Quebec with a population of approximately 3000 people. The community is accessible by road and located one hour away from a town.

The community has one elementary school and one high school. Both the Principal of the elementary school and community members provided consent and were in agreement with the study. Teachers and community members attended information sessions in November 2003, January 2004, and October 2004. The study was also described at a community health fair in February 2004. Just prior to data collection in October 2004, researchers met with school board committee members to inform them of the study commencement and to address any further concerns. Teachers and administration who attended did not feel that the study would be excessively disruptive or detrimental to school performance.

3.2 Ethics

Ethical approval was granted by the University of Alberta from the Human Research Ethics Board in the Faculty of Agriculture, Forestry and Home Economics. The Certificate of Approval from the University of Alberta is appended (Appendix C). The study was also approved by the community's Public Health Department, elementary school and the Cree Board of Health and Social Services of James Bay. These documents are not appended in order to maintain the community's anonymity.

In October 2004, members of the research team met with each classroom to discuss the project with students. At that time information sheets (Appendix A) and consent forms (Appendix B) were distributed to students to take home to their parents or guardians.

3.3 Pilot Study

A pilot study was performed in June 2004 with grade 6 students from the participating elementary school to evaluate the methods and tools. Grade six students were selected as it was assumed that students would be in grade 7 and therefore ineligible when the study began October 2004. A total of 41 of 59 eligible students provided parental consent to participate in the pilot study. The body image questionnaire used during the pilot study was modified from Stevens et al. (1999) to include six figures (versus eight) arranged randomly (versus smallest to largest in the original publication). By using fewer figures, it was hoped that children would be better able to choose the figure that looked like them. By placing figures in a random order, researchers hoped to remove any preconceived notions about the value of each figure given its ordered placement among other figures (Doll, Ball, and Willows, 2004). Harter's Self Perception Profile for Children (SPPC) (1985) was used to evaluate self-concept. The following revisions to the body image questionnaire and self-concept measurements were implemented for the final study based on the results obtained from the pilot study.

1. Rather than using six pre-selected figures in random order, all eight figures from the original publication by Stevens et al. (1999) were included, arranged from smallest to largest. The decision was made to not modify the tool to allow direct comparisons of results from this research to those of Stevens et al. (1999), particularly with respect to perceived body size, desired body size, body dissatisfaction, and perceived relationship between health and body size. In the pilot study, it was found that children were trying to reason which figures were smallest and which were largest. That is, it appeared that children were taking time to compare figures perhaps placing them in their minds from smallest to largest. By presenting the figures in order, we eliminated this reasoning process and allowed them to focus on answering the question itself.
2. In the pilot children were asked "I like the way I look now." Available responses included "Yes", "No", and "I don't know". In the revised version, the option for "I don't know" was removed. It was felt by researchers to be an unsuitable response since no child circled "I don't know" in the pilot study. Therefore, researchers felt students were able to choose either a yes or no response.

3. In the pilot study children were asked "Circle the figure below who is most likely to get diabetes when they grow up". In the revised version, there was a preceding question: "Do you know what diabetes is?" "Yes" or "No". The original assumed children understood the concept of diabetes, however, this assumption was found to be untrue for some children.

4. In the revised questionnaire, a page was appended of the silhouettes of Stevens et al. (1999) so that the questionnaire administrator could rate each child's body size. The rater chose the figure they believed the child resembled. Raters were registered dietitians and deemed to be the 'expert' raters. The child was not able to view the result. This was useful in comparing the child's own perception of their body size with how an outsider would view their body size. Body size distortion may have been present if the questionnaire administrator viewed the child to be one size and the child viewed themselves to be much larger or smaller.

5. After piloting the Self Perception Profile for Children (SPPC) by Harter in a grade 6 population, researchers found that the tool may have been confusing to children, and some children were not able to understand the questions due to reading level. As children in this community did not start instruction in English until grade 3 (children are taught in Cree in grades 1 and 2), reading level in English was lower compared to the norm. Therefore, it was important to revisit tools that measured self-concept. The Piers-Harris Children's Self-Concept Scale (2nd edition) was found to be acceptable for children as young as 7 years of age. After reviewing the manual and questions, researchers felt more confident that the study population would easily understand this tool.

3.4 Sample

Grades 4 to 6 students at the participating elementary school were recruited in a rural Cree community in northern Quebec. One hundred fifty one children were eligible for recruitment. Inclusion criteria were any Cree student in grades 4 to 6 who volunteered and received parental permission to participate. All children in grades 4 through 6 were given an information sheet and consent form about the study to take home to their parents.

3.5 Procedures

In October 2004, information sheets (Appendix A) and consent forms (Appendix B) were distributed to each classroom. Completed forms were then returned to teachers. Data collection occurred from October to November 2004 during school hours. Students were individually assessed for dietary recalls, anthropometrics and weight and height measurements. Researchers administered the body image and self-concept questionnaires to students individually or in groups of two. The 20-metre shuttle run was administered in groups. All measures took place at school, in rooms that were provided to researchers. Only weight and height, body image, and self-concept were examined in this study.

No identifying information was kept in the database. Children were given individual identification numbers. As there were a limited number of first and last names in the community, children were asked to put their name and the name of their teacher on the cover sheet of each questionnaire to avoid misidentification. The coversheet containing their names were then removed and destroyed once data were entered. Only those individuals involved in the research study have access to the data. Data collected were kept in a locked cabinet. All computers were password protected.

3.5.1 Weight and Height

A weigh scale and tape measure were used to measure weight and height respectively to calculate Body Mass Index (BMI). An exercise specialist trained two Registered Dietitians from the University of Alberta to measure weight and height. Participants were weighed and measured in indoor clothing and with shoes removed in a private room by the trained researchers. Students were asked to stand against a door where the researcher measured height using a set square and tape measure. Height was measured in centimeters to the nearest tenth. Weight was measured to the nearest pound using a portable scale (Health-O-Meter Professional Scale, Model HAP300-01, Boca Raton, FL, US). Weight in pounds was later divided by 2.2 to provide weight in kilograms for calculation of BMI.

3.5.2 Body Image

Previously published pictures of young Aboriginal children (Stevens et al., 1999) were used to test perceived body size ("Circle the figure that looks the most like you"), desired body size ("Circle the figure that you want to look like"), socially acceptable body size ("Circle the boy/girl that looks the best"), and association of body size with diabetes ("Do you know what diabetes is?"; "Circle the figure that is most likely to get diabetes when they grow up") (Appendix D). Questions also addressed happiness with current body size ("I like the way I look now" in a yes/no format) and perception of whether current body size was too large, too small or just right ("What do you think of your body size?"). Researchers followed and read aloud a scripted, narrative version of the survey that clearly informed students about the purpose of the questionnaire and the questionnaire procedures (Appendix E). If two students were in the same room, they were instructed to sit so that they were unable to view the other student's responses. Students were instructed to wait for the researcher's cue to advance to the next question, answer each question truthfully, and select the answer they thought was the best response. Students were reminded that their responses were confidential.

3.5.3 Body Size Distortion

A visual rating scale adapted from Marshall, Hazlett, Spady, and Quinney (1990) was performed by trained researchers to classify adiposity visually (Appendix F). Once the student left the testing room, the researcher rated the student's adiposity level by choosing the figure that corresponded to the child's appearance. The researcher used the same set of figures of young Aboriginal children as the student had used to rate their perceived body size.

3.5.4 Self-Concept

The Piers-Harris Children's Self-Concept Scale (2nd edition) was used to measure self-concept. Each questionnaire administrator followed and read aloud a scripted, narrative version of the survey that clearly informed students about the purpose of the questionnaire and the questionnaire procedures (Appendix G). If two students were in the same room, they were instructed to sit so that they were unable to view other student's responses. Students were instructed to wait for the researcher's cue to advance to the next question, answer each question truthfully, and select the answer they thought was the best response. Students were reminded that their responses were confidential.

Only overall self-concept and the physical appearance and attributes domain were chosen to be explored for analysis. This decision was made on the basis that self-concept is multidimensional and therefore children may perceive themselves more favorably in one domain versus another. As Piers and Herzberg (2003) note, "domain scales are useful in identifying areas of relative strength and vulnerability in a child's self-concept" (p.21). One of the aims of this research was to explore children's self-concept and its relation with body image or how children think and feel about their physical appearance. In other words, researchers were interested in examining whether physical appearance and attributes are a strength or weakness in contributing to overall self-concept. Piers and Herzberg (2003) note that understanding where strengths and weaknesses are may "be helpful in targeting particular areas for intervention" (p.21).

Piers and Herzberg (2003) also encourage the use of multiple measures to make evaluations on individuals. That is, an integrative process should be used where the results from the Piers-Harris Children's Self-Concept Scale should be understood in the context of other available data (Piers and Herzberg, 2003). For this study, researchers were interested in making comparisons between data collected in the body image questionnaire and the overall self-concept score and Physical Appearance and Attributes domain.

3.6 Data Analysis

Weight status was determined based on BMI, which was calculated by taking weight (kg), and dividing by height (m) squared. BMI was calculated to the nearest 0.01 kg/m^2 and used to classify children as normal weight, overweight, or obese based on the IOTF cut-offs (Cole et al., 2000).

For body image analyses, figures were numbered from one (smallest figure) to eight (largest figure). Body image dissatisfaction was determined by subtracting the figure the child selected as actual from the figure the child selected as ideal. A value of zero indicated body image satisfaction, while scores less than or greater than zero indicated body image dissatisfaction. Body image dissatisfaction was also described in terms of direction and magnitude. If the value was negative, then the child desired a smaller body size, and conversely if the value was positive, then the child desired a larger body size. The actual numerical value indicated the magnitude of dissatisfaction with larger values indicating greater dissatisfaction. Body size distortion was determined by comparing the figure chosen by researchers as resembling the subject and the figure chosen by the subject as resembling their actual body size. A difference of one figure in either direction was considered to be a mild difference; a two figure difference was considered to be a moderate difference; and a three or more figure difference was considered to be a severe difference. No distortion indicated that both the researcher and child selected the same figure.

Self-concept was scored according to the Piers-Harris Children's Self-Concept Scale (2nd edition) manual. Children whose tests indicated a response bias (i.e., a tendency to respond yes or no irrespective of item content), inconsistency (i.e., random response patterns) or exaggeration (i.e., a deliberate attempt to distort his/her answers in order to produce a given effect) were excluded from further analysis as recommended by the manual.

All statistical analyses were done using SPSS for Windows version 13.0. Height, weight and body image data were entered directly into SPSS for analysis. Self-concept was scored manually as per the Piers-Harris Children's Self-Concept Scale procedures. Self-concept scores were then entered into Excel then examined to ensure that data entry error had not occurred. The Excel database was then transferred into the SPSS database where original manual scores were checked in SPSS against scores and student identification numbers. Frequencies and means were used to describe body image measures. T-tests and ANOVA were used for continuous data and chi-square tests were used for categorical variables. A $p < 0.05$ was determined a priori to be statistically significant.

3.7 References

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http://www.creeculture.ca (accessed August 10, 2006)

CHAPTER 4: RESULTS

4.1 Demographics

The participating elementary school had 151 students enrolled in grades 4 to 6. All students in grades 4 to 6 were given consent forms. One hundred fifteen were returned (76% response rate), with 107 agreeing to participate (71%), and 8 not consenting to participate. The final sample however consisted of 105 children as two students did not attend school regularly and were therefore unavailable during the time of testing. Girls represented 58.7% (n = 62) of the sample and boys represented 41.3% (n = 43). The sample was comprised of 44.8% (n = 47) grade 6 students, 25.7% (n = 27) grade 5 students, and 29.5% (n = 31) grade 4 students.

4.2 Weight Status

Weight and height were collected on 104 students as one participant refused to have weight taken. Of the 104 students, based on the IOTF cut-offs, 32.4% (n = 34) of students were normal weight, 30.5% (n = 32) of students were overweight, and 36.2% (n = 38) of students were obese.

4.3 Body Image

Body image questionnaires were completed by all participants (n = 105). On average, there was not a statistically significant difference in the figure chosen to represent actual body size between boys (4.6 ± 1.3) and girls (4.8 ± 1.2) (p = 0.33). On average, however, boys desired a larger body size than did girls (3.7 ± 1.1 versus 3.2 ± 1.1) ($p = 0.04$).

Based on the discrepancy in the figures chosen by children as their perceived actual body size and the body size they would like to look like, 84.8% (n = 89) of children were dissatisfied with their bodies and only 15.2% (n = 16) were satisfied (**Table 4-1**). Although not significant, there was a trend for more girls than boys (90.3% versus 76.7%; $p = 0.06$) to choose a figure smaller than the figure they perceived to resemble their own as the one they would like to look like. Compared to the figure chosen to represent their current body size, 74.3% (n = 78) of students chose a smaller figure, 10.5% (n = 11) chose a larger figure, and 15.2% (n = 16) chose the identical figure as the figure they would like to look like. Of those who indicated a smaller desired figure (n = 78), the majority (n = 60, 76.9%) selected one (42.3%) or two (34.6%) figures smaller than perceived (**Table 4-2**). Of those 14.1% (n = 11) students who selected a larger body size as the one they would want to look like, 63.6% (n = 7) chose one figure larger, 27.2% (n = 3) chose two figures larger, and 9.1% (n = 1) chose 3 figures larger (**Table 4-2**).

In contrast to body dissatisfaction determined by silhouette ratings, when asked what they thought of their body size ("What do you think of your body size?"), 37.1% (n = 39) thought they were 'too big', 6.7% (n = 7) thought they were 'too small', and 56.2% (n = 59) thought they were 'just right'. When prompted to respond 'yes' or 'no' to "I like the way I look now", 57.1% (n = 60) responded yes, and 42.9% (n = 45) responded no. These results indicate t that over half of children were satisfied with their bodies suggesting that perhaps there is a greater acceptance of larger body sizes, although only 15.2% were satisfied based on the silhouettes ratings. Considering the high prevalence of overweight and obesity in this community however, heaviness may be normative. So although children may want to be smaller (as indicated by the silhouette scale), they do not necessarily see their current size as unacceptable – especially those who indicated that they desired to be only one size smaller. The discrepancy in results for body satisfaction may also be rooted in how the question was posed. In the silhouette scale, we asked children what they would *like* to look like versus the worded question that asked what they *think* of their body size. "I like the way I look now" could also have several interpretations including hair, face, arms, legs, among other physical features other than body size. Lastly, a discrepancy in results may have been due to how the question was asked, that is, pictorial (silhouette) versus word formatted questions. The silhouette scale offered greater sensitivity in measurement by providing children with eight figures to choose from whereas the word formatted questions provided only two ('yes' or 'no') or three ('too big', 'too small', or 'just right') choices. Therefore those who only desired one or two sizes smaller or larger on the silhouette scale may have selected 'yes' to "I like the way I look now" or 'just right' to "what do you think of your body size?".

Based on the IOTF weight classifications, body satisfaction decreased as weight status increased as shown in **Table 4-3**. Of those 11 children who desired a larger body size than perceived, 10 were normal weight and 1 was overweight. All obese children desired a smaller body size than perceived. Of children who were satisfied with their body size, 50% were normal weight and 50% were overweight. Of those who thought their body size was too big, 90% were overweight or obese, although 59% of overweight children thought they were 'just right'. Of those who did not like the way they looked now, 82%

were overweight or obese, although again the majority (68.8%) of overweight children liked the way they looked now.

4.3.1 Ideal Body Size

To determine perceived ideal body sizes in boys and girls, participants were asked 'which figure looks the best' for each gender and which figure they would like to look like. As shown in **Table 4-4**, the best figure for boys was 4 (47.6%) then 3 (31.4%). The best figures for girls was 3 (40%) then 4 (32.4%). For both genders, figures 6, 7, and 8 were either poorly selected or not selected at all to look the best. Only 8 children selected very small figures [1 (n = 4) and 2 (n = 4)] and only 5 selected very large figures [6 (n = 3), 7 (n = 1), and 8 (n = 1)] as a 'best' figure for males. In contrast, although very large figures (7 and 8) were not considered for girls, the smallest figure (1) was rated 'best" by 11.4% (n = 12) of children. Figures 1 and 2 are clearly underweight, yet 20% of children chose figures 1 or 2 as looking the best for girls whereas only 7.6% of children chose figures 1 or 2 as looking the best for boys.

When the total sample (n = 105) was included, the average figure chosen as 'best' for boys was larger than the average figure chosen as 'best' for girls (3.7 versus 3.1, $p < 0.001$). The average figure boys chose for 'best' boy and 'best' girl was 3.9 and 3.5, respectively. The average figure girls chose for 'best' boy and 'best' girl was 3.3 and 3.1, respectively. Although the average figures that boys chose as 'best' were larger than the average figures that girls chose as 'best', these differences were not significant.

The average figure boys selected as the figure they would like to look like was 3.7 whereas for girls, the average figure was 3.2. These are virtually equivalent to the average figure that was chosen to look the best. For grade level, the average figure that children in grade 4, 5, and 6 chose as the figure that they would like to look like, was 3.9, 3.1, and 3.2 respectively. Grade 4 children chose a significantly larger figure than children in grades 5 and 6 as the one they would like to look like (p = 0.02).

4.3.2 Body Size Distortion

The researcher's rating of the child's body size was compared to the figure the child chose as looking the most like them. **Table 4-5** illustrates the results. Mild overestimation or underestimation were grouped with no distortion for analysis. This was done because the difference of one figure was deemed by researchers to be unsubstantial considering its basis on human judgment (versus BMI) and the loose clothing worn by children. The majority (83.8%, n = 88) of students were able to accurately depict their own body size when compared to the researcher although 13.4% (n = 14) overestimated their own body size. With the exception of three obese children, children did not underestimate their body size relative to an expert rater. Although more girls (16.1%) than boys (9.3%) overestimated their body size there was no significant difference between the genders (86.1% boys versus 82.3% girls had no or mild distortion). No significant difference was found between weight status and level of distortion although there was a trend of decreasing distortion with increasing weight status (73.5% normal weight, 87.5% overweight, 89.4% obese accurately depicted their body size). Children with normal body weight were more likely to moderately or severely overestimate their body size (n = 9, 26.5%) than overweight (n = 4, 12.5%) or obese (n = 1, 2.6%) children. In part, this might be due to the fact that there was an upper range of figures that obese children could choose from.

4.4 Diabetes

Children were asked to circle one figure that would most likely get diabetes in the future. Researchers deemed that the acceptable or correct responses were figures 6, 7, or 8 as these figures carried visibly greater abdominal adiposity. Of all participants, 68.6% (n = 72) of children chose correctly and 31.4% (n = 33) chose incorrectly.

Knowledge of diabetes was determined by asking participants to circle 'yes' or 'no' to the question "do you know what diabetes is?". While 36.2% (n = 38) responded 'yes', 63.8% (n = 67) responded 'no'. Of those who claimed knowledge of diabetes, 84.2% (n = 32) correctly chose a figure (i.e., figure 6, 7, or 8) that was at risk for developing diabetes. Of those who responded 'no' to knowledge of diabetes, 59.7% (n = 40) still correctly chose a figure that was at risk for developing diabetes. There was a statistically significant difference in the mean figure selected as most likely to get diabetes for those who claimed knowledge of diabetes ($\mu = 6.9$) compared to those who claimed no knowledge ($\mu = 5.6$) ($p = 0.003$).

4.5 Self-Concept

4.5.1 Global Self-Concept

The Piers-Harris Children's Self-Concept Scale (2nd edition) was completed by all participants (n = 105). A number of children (n = 25) whose tests indicated a response bias (n = 13) or inconsistency (n = 14) were excluded from further analysis. Two children had both response bias and inconsistency and therefore were excluded on the basis of more than one of the indicators. No child was eliminated on the basis of exaggeration. Therefore, the total number of participants included in the analysis for self-concept was 80 (76.2%) out of the possible 105. There were no differences between children in age, grade, height, weight or BMI in those in the included versus excluded groups.

Overall self-concept was found to be low in 40% (n = 32), average in 58.8% (n = 47), and high in 1.3% (n = 1) of children (**Table 4-6**). Since only one child scored above average, this child's data was combined with the average grouping for analysis. No significant difference existed between weight status, gender, or grade level with respect to level of self-concept.

4.5.2 Physical Appearance and Attributes Domain

On the physical appearance and attributes domain, 46.8% (n = 37) of children had low scores, 50.6% (n = 40) of children had average scores, and 2.5% (n = 2) had above average scores. Of the two children with above average scores, both were normal weight. Since only two children scored above average, these data were combined with the average grouping for analysis. While approximately one third of normal weight (34.6%) children scored low on the physical appearance and attributes domain, just over half of overweight (54.2%) and obese (51.7%) children had low scores (**Table 4-6**).

Table 4-7 outlines comparisons made within the physical appearance and attributes domain. There was a statistically significant difference between boys and girls for the physical appearance and attributes domain. Fifty-eight percent (n = 29) of girls scored low on this domain compared to 26.7% (n = 8) of boys (p = 0.007). Grade level also demonstrated a difference in this domain where 26.1% (n = 6) of grade 4 children, 41.2%

(n = 7) of grade 5 children, and 60% (n = 24) of grade 6 children scored low (p = 0.03). Those children who did not like the way they looked based on the statement "I like the way I look now" had lower scores on the physical appearance and attributes domain (59.5%) than those who did like the way they looked (34.9%) (p = 0.03). There was a trend for those who felt they were too big to score lower on the physical appearance and attributes domain compared to those who felt they were too small or just right (63.3% versus 25.0% and 37% respectively, p = 0.05).

Table 4-1
Body satisfaction determined by comparing perceived and desired body size

	Desired larger body size	Satisfied with current body size	Desired smaller body size
Total (n=105)			
n	11	16	78
%	10.5	15.2	74.3
Girls (n=62)			
n	5	6	51
%	8.1	9.7	82.3
Boys (n=43)			
n	6	10	27
%	14.0	23.3	62.8

Table 4-2

Comparisons of body dissatisfaction by magnitude

	Number of figures different from perceived				
	1	**2**	**3**	**4**	**5**
Desired smaller body size (n=78)					
n	33	27	11	3	5
%	42.3	34.6	14.1	3.8	6.4
Desired larger body size (n=11)					
n	7	3	1	0	0
%	63.6	27.2	9.1	0	0

Table 4-3

Decreasing body satisfaction with increased weight status

	IOTF Weight status		
	Normal weight	**Overweight**	**Obese**
Total n (104)*	34	32	38
Perceived actual versus desired body size			
Desired same as perceived	23.5% (n=8)	25.0% (n=8)	0
Desired smaller than perceived	47.1% (n=16)	71.9% (n=23)	100% (n=38)
Desired larger than perceived	29.4% (n=10)	3.1% (n=1)	0
Total	100%	100%	100%
What do you think of your body size?			
Just right	76.5% (n=26)	59.4% (n=19)	34.2% (n=13)
Too small	11.8% (n=4)	9.4% (n=3)	0
Too big	11.8% (n=4)	31.3% (n=10)	65.8% (n=25)
Total	100%	100%	100%
I like the way I look now.			
Yes	76.5% (n=26)	68.8% (n=22)	28.9% (n=11)
No	23.5% (n=8)	31.3% (n=10)	71.1% (n=27)
Total	100%	100%	100%

* 1 participant refused weight measurement

Table 4-4

Figures selected as the one that 'looks the best' for boys and girls

			Figure (1= smallest to 8=largest)							
Gender		**Mean**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Boy	**Total (n=105)**	**3.7**	3.8% (n=4)	3.8% (n=4)	31.4% (n=33)	47.6% (n=50)	8.6% (n=9)	2.9% (n=3)	1% (n=1)	1% (n=1)
	Boys (n=43)	3.9	2.3% (n=1)	0	30.2% (n=13)	51.2% (n=22)	9.3% (n=4)	2.3% (n=1)	2.3% (n=1)	2.3% (n=1)
	Girls (n=62)	3.5	4.8% (n=3)	6.5% (n=4)	32.3% (n=20)	45.2% (n=28)	8.1% (n=5)	3.2% (n=2)	0	0
Girl	**Total (n=105)**	**3.1**	11.4% (n=12)	8.6% (n=9)	40% (n=42)	32.4% (n=34)	6.7% (n=7)	1% (n=1)	0	0
	Boys (n=43)	3.3	9.3% (n=4)	2.3% (n=1)	44.2% (n=19)	39.5% (n=17)	4.7% (n=2)	0	0	0
	Girls (n=62)	3.1	12.9% (n=8)	12.9% (n=8)	37.1% (n=23)	27.4% (n=17)	8.1% (n=5)	1.6% (n=1)	0	0

Table 4-5

Level of body size distortion between gender and IOTF weight status

	Distortion scale						
	severe over estimation	**moderate over estimation**	**mild over estimation**	**no distortion**	**mild under estimation**	**moderate under estimation**	**severe under estimation**
Total (n=105)	2.9% (n=3)	10.5% (n=11)	26.7% (n=28)	38.1% (n=40)	19.0% (n=20)	2.9% (n=3)	0
Gender							
Boys (n=43)	2.3% (n=1)	7.0% (n=3)	32.6% (n=14)	39.5% (n=17)	14.0% (n=6)	4.7% (n=2)	0
Girls (n=62)	3.2% (n=2)	12.9% (n=8)	22.6% (n=14)	37.1% (n=23)	22.6% (n=14)	1.6% (n=1)	0
IOTF weight status							
Normal (n=34)	8.8% (n=3)	17.6% (n=6)	38.2% (n=13)	35.3% (n=12)	0	0	0
Overweight (n=32)	0	12.5% (n=4)	37.5% (n=12)	34.4% (n=11)	15.6% (n=5)	0	0
Obese (n=38)	0	2.6% (n=1)	7.9% (n=3)	44.7% (n=17)	36.8% (n=14)	7.9% (n=3)	0

Table 4-6

Scores for overall self-concept and physical appearance and attributes by IOTF weight status

	Overall Self Concept			Physical Appearance & Attributes Domain		
	Low	Average	Above average	Low	Average	Above average
Normal (n=26)						
n	10	16	0	9	15	2
%	38.5	61.5	0	34.6	57.7	7.7
Overweight (n=24)						
n	9	14	1	13	11	0
%	37.5	58.3	4.2	54.2	45.8	0
Obese (n=29)						
n	13	16	0	15	14	0
%	44.8	55.2	0	51.7	48.3	0
Total (n=79)*						
n	32	46	1	37	40	2
%	40.5	58.2	1.3	46.8	50.6	2.5

*25 participants were excluded from analysis based on exclusion criteria of response bias or inconsistency; 1 participant refused weight measurement

Table 4-7
Comparisons within the physical appearance and attributes domain

	Physical Appearance & Attributes Domain		
	Low (%)	**Average or Above average (%)**	**p value**
Gender			
Boys (n=30)	26.7 (n=8)	73.3 (n=22)	0.007
Girls (n=50)	58.0 (n=29)	42.0 (n=21)	
Grade level			
4 (n=23)	26.1 (n=6)	73.9 (n=17)	0.031
5 (n=17)	41.2 (n=7)	58.8 (n=10)	
6 (n=40)	60.0 (n=24)	40.0 (n=16)	
What do you think of your body size			
Too big (n=30)	63.3 (n=19)	36.7 (n=11)	0.054
Too small (n=4)	25.0 (n=1)	75.0 (n=3)	
Just right (n=46)	37.0 (n=17)	63.0 (n=29)	
I like the way I look now			
Yes (n=43)	34.9 (n=15)	65.1 (n=28)	0.028
No (n=37)	59.5 (n=22)	49.5 (n=15)	

CHAPTER 5: DISCUSSION

5.1 Strengths and Limitations

There are several strengths of this study including the pilot study. By performing the pilot study researchers were able to test research protocols, proposed methods and instruments and make adjustments to reduce the risk of failure (van Teijlingen and Hundley, 2002). Another strength of this study was the use of age and ethnic appropriate figures in the body image questionnaire. This increased the likelihood for children to identify with the figures more accurately and choose the best response to each question. Furthermore, in this study, weight and height were measured to derive BMI so comparisons with weight status could be made with the data collected. This is a particular strength of this study as several surveys and research papers have relied on reported weights and heights, which have been known to skew data (e.g. self-reported data underestimates the prevalence of overweight and obesity). Comparisons with weight status were one limitation reported in the study by Stevens et al. (1999) where associations with weight status were not possible. Also, in our body image questionnaire, the questions "I think my body size is: too big, too small or just right" and "I like the way I look now" served to complement and provide independent verification from silhouette ratings. Another strength of the study was that a researcher independently verified children's body shape using silhouettes. The correspondence in the figure chosen as perceived by the child and the figure chosen by the researcher verified that children were able to correctly identify their own body size using silhouettes.

Several limitations are noted in this study. First, the participation rate for this study was 69.5% which leaves 30.5% of children who were not represented in the dataset. It is not clear if or how inclusion of the non-participants in the study would have changed the findings of the study or if non-response bias was present.

Secondly, interpretation of the Piers-Harris Children's Self-Concept Scale may be problematic as the normative sample was different than the subjects in this study. For the standardization sample, ethnic composition was similar to the United States census figures with Aboriginal people representing only 1.2% of the sample (Piers and Herzberg, 2002). Also, with regards to education, 62.2% of the standardization sample had a head of household with some post secondary education. In comparison, over half (57.3%) of on-reserve Cree in northern Quebec did not complete secondary school and therefore had no post secondary education (Statistics Canada, 2001). Caution therefore must be exercised when interpreting this study's findings with regards to self-concept. Furthermore, although the Piers-Harris Children's Self-Concept Scale is considered appropriate for children as young as 7 years of age and with at least a grade 2 reading level, the Cree children who participated may have had trouble reading or understanding the test. Data collection occurred at the beginning of the school year from October to November and children's English language competency might not have been adequate for the test. As children do not start instruction in English until grade 3, it was possible that some grade 4 students did not fully understand questions as reading level in English at that point may not have been established at the grade 2 level.

Thirdly, qualitative methods were not employed to explore the children's interpretation of questions. In the body image questionnaire, "I like the way I look" could have had several meanings including body shape, body size, weight, height, hair, or eyes among other physical attributes. Individual or focus group interviews would have allowed researchers to confirm specific attributes that children commonly thought about when responding to this question.

5.2 Weight Status

Compared to the general Canadian population where 26.2% of children were overweight or obese (Shields, 2005), in our study, we found the prevalence in Cree youth to be two and a half times greater. Two-thirds (66.7%) were overweight or obese while only one third (32.4%) were normal weight. This is higher than previous findings by Ngnie Teta (2002) in the Cree communities and the *First Nations Regional Longitudinal Health Survey 2002-2003* (First Nations Centre, 2005). Ngnie Teta (2002) found 59% of James Bay schoolchildren to be either overweight or obese. In the *First Nations Regional Longitudinal Health Survey 2002-2003*, just over half (55.2%) were found to be overweight or obese (First Nations Centre, 2005). Our study not only confirms the high prevalence rates of obesity among Aboriginal youth, but shows that current rates in James Bay exceed previous rates. It further demonstrates the urgency for obesity prevention programs among Aboriginal populations.

5.3 Body Image

5.3.1 Body Dissatisfaction

Body dissatisfaction, determined by using a silhouette scale, was found in 84.8% of children, with 74.3% desiring smaller than perceived body size, which is higher than previous studies. In comparison, 56.2% of children thought their body size was 'just right' and 57.1% liked the way they looked now. Although there was a trend of decreasing body satisfaction with increasing weight status, the majority of overweight children thought their body size was 'just right' and liked the way they looked now (59.4% and 68.8%, respectively). This finding suggests that heaviness may be acceptable or even normative considering two-thirds of the children were overweight or obese. Overweight or obese children may therefore find their body size to be socially acceptable. However, of those who thought they were 'too big' and those who did not like the way they looked now, 90% and 82%, respectively, were overweight or obese. This suggests that weight status may still be an influential factor in determining whether children are satisfied with their bodies.

The silhouette scale offers greater sensitivity in measurement, which may also explain the higher rates of body dissatisfaction. Here, the majority of children (66.7%) desired only one (38.1%) or two (28.6%) sizes smaller or larger than their perceived current size. Therefore, although children may want to be slightly smaller or slightly larger, they do not perceive their current size as unacceptable. It may be quite common for people to desire to be smaller but not judge themselves as overly large or small particularly if they have not been told so.

Although the majority of students wanted to be only one or two body sizes smaller than their perceived body size, a sizable percentage (24.3%) wanted to be three or more figures smaller than their perceived body size. Using the same silhouettes of Aboriginal boys and girls, Stevens et al. (1999) reported body dissatisfaction among 41% of fourth grade children living on reserves, while Rinderknecht and Smith (2002) reported body dissatisfaction among 52% of urban Aboriginal youth aged 5 to 18 years. Davis and Lambert (2000) also created ethnic appropriate silhouettes and found 63% of fifth grade Aboriginal children living in rural areas were dissatisfied with their bodies. This data supports the thought that Aboriginal children living on reserves or in rural settings are susceptible to experiencing body dissatisfaction.

In our study, rates of body dissatisfaction were comparable to or higher than rates reported in non-Aboriginal populations. Wood, Becker, and Thompson (1996) reported 46% of children were dissatisfied with their bodies in a predominantly Caucasian sample. Collins (1991) reported among Caucasian preadolescent children that 42% of girls and 30% of boys desired to be thinner. When Story et al. (1994) compared Aboriginal girls to a group of Caucasian girls, body dissatisfaction was higher among Aboriginal girls (49.8% versus 46.0%, $p < 0.001$). Furthermore, Story et al. (1995) compared weight satisfaction among several ethnic groups and found 46.6% of black, 46.2% of Asian, 41.6% of Hispanic, 37.8% of white and only 33.3% of Aboriginal people were satisfied. While our data opposes previous notions that Aboriginal ethnicity and culture offer a protective role in predicting body satisfaction, it is also plausible that the high prevalence rates of overweight and obesity are the underlying issue.

5.3.1.1 Gender

Body dissatisfaction was more common among girls than boys, which is consistent with existing literature. Although not significant, there was a trend for more girls than boys to be dissatisfied with their body sizes ($p = 0.057$). Eighty two percent of girls compared to 63% of boys chose smaller figures as desired versus perceived. In

Stevens et al. (1999), almost half of Aboriginal girls (48%) compared to one third of Aboriginal boys (34%) chose smaller figures as desired versus perceived. Even among urban Aboriginal youth, Rinderknecht and Smith (2002) found that 61% of girls compared to 41% of boys desired to be thinner. This is consistent with findings by Collins (1991) and Wood et al. (1996) among samples that were predominantly Caucasian. Wood et al. (1996) reported among youth 8 to 10 years of age, 45% of girls desired to be thinner compared to 19% of boys. Results from this study support that body dissatisfaction is more prevalent among girls than boys. The reason for this is firmly embedded in our societal value that thin is beautiful, particularly for females (Demarests and Allen, 2000; Furnham and Alibhai, 1983).

5.3.1.2 Weight Status

Body weight was an important factor in determining whether children would be more likely to be dissatisfied with their body size. Heavier children were more likely to choose a smaller body size as desirable versus perceived, to think their body size was too big, and to respond "no" to the statement "I like the way I look now". In our study, 100% of obese, 71.9% of overweight and 47.1% of normal weight children desired a smaller body size than perceived. Ten of the 11 children who desired a larger body size than perceived were normal weight and one was overweight. Furthermore, of children who were satisfied with their body size, 0% were obese, 50% were normal weight and 50% were overweight.

Previous studies with Aboriginal children and adolescents have also documented this trend of increasing body dissatisfaction with increasing weight status. Davis and

Lambert (2000) found among fifth graders 61.1% of overweight, 19.3% of normal weight, and 3.7% of underweight boys preferred a thinner body size than their perceived current body size. In contrast, it was found that 78.9% of overweight, 32.2% of normal weight and 13.1% of underweight girls preferred thinner body sizes compared to perceived (Davis and Lambert, 2000). Among Aboriginal boys 5 to 18 years of age, 41% wanted to be thinner while 21% wanted to be heavier although of those who desired to be thinner, 90% were overweight or obese (Rinderknecht and Smith, 2002). Neumark-Sztainer et al. (1997) also reported increasing weight dissatisfaction, low body pride, and weight concerns with increasing weight status. More specifically, 55.9% of very overweight, 44.8% of moderately overweight, and 30.7% of non-overweight boys expressed weight dissatisfaction (Neumark-Sztainer et al., 1997). Among girls, 84.4% of very overweight, 76.9% of moderately overweight, and 59.1% of non-overweight expressed weight dissatisfaction (Neumark-Sztainer et al., 1997). Among a group of adolescent girls, Story et al. (1994) also reported 66.5% overweight, 25.2% of normal weight and 8.3% of underweight expressed body dissatisfaction. Gittelsohn et al. (1996) also demonstrated among Ojibway Cree that those who perceived their body size as large were more dissatisfied with their body shape than those who perceived thinner body sizes.

5.3.2 Ideal Body Size

When both boys and girls were asked to choose the figure that looks the best, the most common response was figure 4 for boys and figure 3 for girls. The mean figure chosen as ‘best’ for boys was larger than the figure chosen as ‘best’ for girls (3.7 versus

3.1, $p < 0.001$). Boys on average, selected a larger figure as the one they would like to look like than girls (3.7 versus 3.2). Davis and Lambert (2000) found that girls chose thinner males and females as best looking compared to males. Furthermore, Rinderknecht and Smith (2002) found that the mean desired figures were 3.92 for boys and 3.18 for girls, which is very comparable to the present findings.

Among Cree children, large figures were generally undesirable as no girls and only two boys chose the two largest figures as 'best'. Similarly, Rinderknecht and Smith (2002) found that the two largest figures were not selected by either girls or boys as their ideal figure. We also found that 20% of girls selected the first two figures as 'best' when they are clearly underweight suggesting that Western ideals of thinness have penetrated this rural community. Among preadolescent schoolchildren who lived in rural areas, Davis and Lambert (2000) found that as BMI increased, thinner figures were selected as best looking. They however also reported that the more geographically isolated students chose a larger body shape as best looking. Among on reserve females, Gittelsohn et al. (1996) reported that although they expressed a desire to be thinner, when compared to Western populations, their ideal figures remained larger. In general, findings negate the previous notion that larger figures may be more acceptable among rural settings or certain cultural groups including Aboriginal peoples.

5.3.3 Body Size Distortion

Body size distortion was examined to determine whether children could accurately perceive themselves as an outsider would. In our study, we found that children were able to accurately select a figure that represented their current body size as compared to an expert rater. Comparisons between the expert's rating and the child's rating of their body size showed no differences. Similarly, Williamson and Delin (2001) found that preadolescent children were able to select a figure that most accurately represented their own BMI. Body size distortion was not an issue in our sample and supports that children are able to correctly identify their own body size (when compared to an expert rater) using silhouette scales.

5.4 Diabetes Awareness

Although most children reported knowledge of diabetes, 36.2% claimed no knowledge of diabetes. Considering the high rates of diabetes in the community and that almost every child would have a relative with the disease, knowledge of diabetes was expected to be higher. It is possible, that the term diabetes is not culturally sensitive enough for children despite the term being displayed in the community clinic. Children may have been more familiar with the Cree term "uschiniichisuu". It is also possible that children were not confident with their answer as they may know of the disease but not necessarily understand what it is. This may explain the relatively high number of children (59.7%) who circled the correct figure size as most likely to get diabetes despite answering 'no' to "do you know what diabetes is?".

In our study, 42% of all children and 58% of children who claimed knowledge of diabetes chose the largest figure as most likely to get diabetes. In another study, 55% of youth (60% boys, 51.3% of girls) chose the largest figure as most likely to develop diabetes (Rinderknecht and Smith, 2002). The three largest figures however appeared visibly overweight, predominantly in the abdominal area, and would be at risk for developing diabetes. Of children who claimed knowledge of diabetes, 84.2% chose the one of the 3 largest figures as the one most likely to get diabetes, indicating an understanding between weight and risk for diabetes.

5.4 Self-Concept

5.4.1 Global Self-Concept

In our study population, although the majority (58.8%) had average self-concept scores, a large percentage (40%) had low self-concept scores. Mikasuki children living on reserve have also been reported to score significantly below the normative sample (Lefley, 1975). Our findings support that Aboriginal children may be more susceptible to lower self-concept scores. Demographically, lower education levels were achieved among Cree in northern James Bay compared to the normative sample. Therefore, it may not be surprising that a large percentage of our subjects had low self-concept scores as it may be a reflection of lower socioeconomic status. Aboriginal people are more likely than non-Aboriginal people to have lower social and economic status, including lower household incomes, lower education levels, and lower rates of employment (CIHI, 2004). Lower socioeconomic status may limit opportunities for children to participate in activities that encourage development of self-concept. Minority groups may also be subject to racial discrimination, academic failure secondary to language deficits, and difficulties fitting into mainstream culture (Piers and Herzberg, 2003). It is also thought that the prejudiced attitudes of the larger society may filter down to Aboriginal children causing them to perceive their own ethnicity negatively (Pedersen and Walker, 2000). This may predispose Aboriginal children to lower self-concepts by internalizing these messages; it is unclear if geographic isolation (e.g. on reserve) may shield children against such attitudes.

Of those who scored low on self-concept, 90% also wanted a smaller body size than what they perceived their current size was, however no relationship was found between self-concept and weight status. This suggests that excess weight may not cause low self-concept but that the perception of weight and dissatisfaction with weight (wanting to be smaller) may be more important in the development of self-concept. This is consistent with a meta-analysis performed by Miller and Downey (1999) where the relationship between weight and self-esteem was higher among those studies that used self-perceived weight than actual weight. Miller and Downey (1999) go on to report that "because physical appearance is such an important domain in the Western culture, and because conforming to the ideal of a thin, fit body is an important component of physical appearance, self-perceptions about being overweight and body satisfaction should be strongly associated" (p.70). Our findings suggest that Aboriginal youth are internalizing the message that thin is better and physical appearance is an important evaluative component of the self.

Caution must be taken when interpreting our findings and those among Mikasuki children. The original Piers-Harris' normative sample was primarily Caucasian, and in the revised Piers-Harris that was used with Cree children, the normative sample still included very few (1.2% of the sample) Aboriginal children.

5.4.2 Physical Appearance and Attributes Domain

In our study, children who did not like the way they looked scored lower on the physical appearance domain, than those who liked the way they looked. In addition, 34.6%, 54.2%, and 51.7% of normal weight, overweight, and obese respectively, scored low. Only two children in our sample scored above average in this domain, and both were normal weight. Furthermore, there was a trend for those who felt they were too big to score lower on the physical appearance and attributes domain compared to those who thought they were too small or just right. Lawrence and Thelen (1995) also reported that concern with being or becoming overweight was associated with lower scores on the physical appearance subscale among African-American and Caucasian children. Mendelson and White (1982) reported that overweight children were more likely than normal weight children to have lower opinions about their bodies and personal appearance. Considering that our society values thinness and, that high rates of overweight and obesity were found in our study, it is possible that physical appearance was the most salient domain of self-concept for these children.

In our study, we also found that both gender and grade level were factors in predicting scores in this domain. A greater percentage of girls (58.0%) scored low compared to boys (26.7%) (p = 0.07). Similarly, O'Dea and Abraham (1999) found that Australian adolescent boys had more positive self-concept with regards to physical appearance than females. Folk, Pedersen, and Cullari (1993) reported among third and sixth grade girls in Pennsylvania that body satisfaction was positively correlated with the physical appearance and attributes domain. For grade level, low scores in the physical appearance and attributes domain were found in 26.1%, 41.2% and 60% of children in grades 4, 5, and 6 respectively. Marsh (1989) reported that self-concept with respect to physical appearance declined as grade level increased in Australian girls from grade 2 to grade 9. This effect was not observed in boys (Marsh, 1989). O'Dea and Abraham (1999) did not find a relationship with age and physical appearance subscale scores but offered that the age range (11.4 to 14.6 years) of their subjects may have been too narrow to observe age-related differences and that perhaps pubertal status would be a more important factor. In our study, participants ranged from grades four to six and therefore, pubertal changes and growing importance of attractiveness to the opposite sex may have played a role in explaining the difference between grade levels.

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CHAPTER 6: CONCLUSIONS

6.1 Conclusions

This study negates the previous notion that certain ethnic groups including Aboriginal peoples are protected from poor body image or low self-concept by their geographic or cultural background. Not only did Cree children in the present study express dissatisfaction with their body size, but rates of dissatisfaction in this study exceeded rates previously reported in other Aboriginal communities and studies with Caucasian samples. Many children in our study expressed a desire to be thinner with nearly one fourth of these children desiring three or more body sizes smaller. This level of body dissatisfaction may be partially explained by the high rates of overweight and obesity in Cree schoolchildren found in this study. There was also a trend for girls more than boys to be dissatisfied with their body size which may indicate that standards of beauty and physical appearance may be more stringent among females. Overweight is not only a concern among health care practitioners but also among the community and as we observed, even among the children as expressed by their desire to be thinner.

In our study, we also explored knowledge of diabetes and found that the majority of schoolchildren were able to accurately select figures that were at risk for developing the disease. This finding suggests that children were able to demonstrate an understanding between overweight and risk for diabetes. Understanding the health consequences of obesity may also be a motivating factor in weight loss and contributed to findings of body dissatisfaction (i.e. desiring to be thinner). We also found that children were able to accurately depict their own body size when compared to ratings of body size by an outsider. Body size distortion was therefore not an issue in our sample and suggests that silhouette scales are appropriate measurement tools for determining body satisfaction.

Although the majority of schoolchildren had normal self-concept scores, there was a sizable percentage who had low self-concept scores. While there were no differences found among weight status groups, body dissatisfaction appeared to be an important factor with 90% of those having low self-concept scores expressing a desire to be thinner. On the other hand, as weight status increased, scores in the physical appearance domain were lower. In addition, schoolchildren who thought their body size was too big or stated that they did not like the way they looked were more likely to have lower scores in physical appearance domain. Therefore, it appeared that poor body image was more predictive than weight status of self-concept although weight status was an important factor of physical appearance self-concept.

The findings of this study demonstrate that Aboriginal youth are dissatisfied with their bodies and have poor self-concept with regards to their physical appearance. While nutrition and physical activity have been primary components of obesity interventions, this study suggests that the mental and emotional aspects of well-being, such as self-esteem and body image, should be included as important components of these interventions. O'Brien et al. have suggested that "feeling good about oneself may contribute towards one's ability to improve one's obesity status" and found that self-esteem was a strong predictor of weight change (as cited in French, Story, and Perry, 1995, p. 486).

6.2 Recommendations

6.2.1 Recommendations for Interventions

Obesity interventions are clearly needed among Aboriginal people as rates of obesity and type 2 diabetes continue to rise. Interventions should be comprehensive and embody a holistic view of health involving the balancing of the "physical, mental, and emotional and spiritual well being" of Aboriginal people (First Nations and Inuit Health Branch, 2003). Inclusive in these interventions should be aspects of nutrition, physical activity, traditional practices, body image, and self-concept.

An ecological model presents "health as a product of the interdependence between the individual and subsystems of the ecosystem" (Green, Richard and Potvin, 1996, p.272); it "directs attention to both behavior and its individual and environmental determinants" (McLeroy, Bibeau, Steckler and Glanz, 1988, p.354). Through an ecological perspective, body image and self-concept are determined by the interactions among the individual, interpersonal, community and societal factors. **Table 6-1** illustrates recommendations at each level of influence.

Schools may be appropriate sites for interventions by offering an environment that can act on several levels of influence. Schools can be conducive to learning (individual level) and developing positive peer relationships (interpersonal level). They can also promote nutrition (e.g. lunch or snack programs) and provide opportunities for children to increase their physical activity (e.g. after school activities, physical education classes) (community level) (Kumanyika and Grier, 2006). Schools are an ideal site for such primary prevention programs; however integrating the family, other community resources and government should also be considered.

Significant gaps continue to exist between the health of Aboriginals and the health of Canadians as a whole. Kumanyika and Grier (2006) state that these disparities can only be reduced by improving the social and economic environments of ethnic minority groups. *Toward a healthy future, Second report on the health of Canadians* suggests that achieving population health requires a more equitable distribution of incomes (Federal, Provincial, and Territorial Advisory Committee on Population Health [ACPH], 1999). Government can also provide support through funding interventions and introducing policy changes that promote healthy living including regulations on media.

Attitudes and behaviors towards eating, weight, and dieting are shaped in childhood and early adolescence. Research has found that children are aware of the sociocultural affinity towards thinness through influences from family, peers and media (especially television) (Shapiro, Newcomb, and Loeb, 1997; Davis and Lambert, 2000). Kumanyika and Grier (2006) suggest that programs should include parents so that they may model and incorporate health promoting behaviors in the home. Furthermore, as children are bombarded with media advertisements for calorie dense and high fat foods, Kumanyika and Grier (2006) suggest that not only can policy makers encourage changes to media regulations on food and body size related images, but that children can increase their knowledge on media literacy.

Preventing children from engaging in unhealthy weight loss attempts is also important. Although not investigated in this study, weight loss attempts have been associated with body dissatisfaction. Stevens et al. (1999) found that weight loss attempts were present even among fourth grade Aboriginal students, particularly those who were unhappy with their weight. Weight loss methods included exercising more, skipping meals, and not eating for an entire day (Stevens et al., 1999). Other researchers have also reported self-induced vomiting, diet pills, and laxative or diuretic use (Story et al., 1994; Rosen et al., 1988). These behaviors may precede an eating disorder. It is therefore essential that in the promotion of positive body image and healthy eating, that we continue to do no harm by avoiding discussions on eating disorders particularly with respect to methods to lose weight.

Overall, primary prevention programs need to focus on health promoting behaviors rather than solely weight loss by incorporating aspects of nutrition, physical activity, traditional practices, self-concept and body image. Important to the success of these programs is building self-efficacy in children and empowering them to make positive changes. Interventions should act on the determinants of health by promoting healthy child development and developing personal and coping skills. On a broader level, actions should be taken to reduce inequities by improving the social and economic environments of Aboriginal people.

6.2.2 Recommendations for Future Research

Until recently, obesity research focused on describing prevalence rates, treatment and risk for obesity related chronic disease (Davis et al., 1999). Today, the importance of primary prevention interventions is widely recognized. Not only are nutrition and physical activity important components of these interventions but as this study has indicated, body image and self-concept are equally valuable topics to address. Limited research has been performed among minority groups in the area of body image and self-concept particularly among Aboriginal people.

Existing literature, along with this study, does tend to support that young Aboriginal people are susceptible to body image issues. This finding however was determined using questionnaires with silhouette scales. Richer and more detailed data could be retrieved by using other methodologies including individual or group interviews. Further information on how the body is perceived in relationship to culture could be defined by children through these methods. Caution should be exercised however as there is the potential to cause harm if questions are too sensitive or if interviewers are poorly trained. Understanding where children receive and internalize their belief and value systems (e.g. media, parents, peers) regarding body size and/or shape and beauty would also be useful in developing obesity intervention programs.

Limited research exists on the level of self-concept among Aboriginal children. Although this study reported results on global self-concept and the physical appearance and attributes domain, further examination of the remaining five domain scales (i.e. intellectual and school status, popularity, happiness and satisfaction, behavioral adjustment and freedom from anxiety) should be performed to enable researchers to make additional conclusions regarding self-concept. Development of an appropriate measurement tool that is both culturally and linguistically appropriate would also be an important step towards understanding the psychological well-being of Aboriginal youth.

Continued collaboration and partnership with the community will be essential to successful research projects. Through partnership, meaningful data is collected. **Table 6-2** outlines current gaps in knowledge based on the ecological levels of influence.

Table 6-1
Recommendations for interventions from an ecological perspective

Level	Recommendations
Individual	- increasing personal knowledge on health promoting behaviours - increasing personal knowledge on normal growth and development - increasing personal knowledge on media literacy (e.g. protecting themselves from the unrealistic images portrayed in media)
Interpersonal (i.e. parents, friends, peers, teachers)	- avoidance of remarks based on appearance and weight - avoidance of teasing and/or bullying - role modeling and encouragement of positive behaviors - increasing children's knowledge on health - encouragement and praise on abilities versus appearance
Community (i.e. schools, community)	- school-based programs - activities that promote well-being - opportunities for children to exercise health promoting behaviours
Societal	- regulations on media - reducing socioeconomic inequities

Table 6-2

Recommendations for research from an ecological perspective

Level	**Recommendations**
Individual	- Understanding of current knowledge of Aboriginal youth on: health promoting behaviors, normal growth and development, and media literacy - Understanding of individual factors that determine behaviors
Interpersonal (i.e. parents, friends, peers, teachers)	- Understanding how relationships with parents, peers, teachers, or others influence a child's behaviors and frames their values and beliefs
Community (i.e. schools, community)	- Understanding of current school curricula - Understanding of cultural values, beliefs and practices surrounding the issue - Environmental scan
Societal	- Understanding influence of media on body image and self-concept - Understanding how socioeconomic inequities impact body image and self-concept

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APPENDICES

APPENDIX A: INFORMATION SHEET

INFORMATION SHEET

Title of Project: **Emiyuu Ayayaachiit Awaash Project**
The Active Kids Project

Researchers at the University of Alberta:

Noreen Willows, PhD, Associate Professor, Department of Agricultural, Food and Nutritional Science, phone: (780) 492-3989, email: noreen.willows@ualberta.ca

Members of Steering Committee
Jane Blacksmith, Director, Public Health Department
tel: 923-3461, ext. 205
Kitty Blacksmith, Assistant Director, Public Health Department,
tel: 923-3461, ext. 314
Paul Linton, Director of Uschiniichisuu, Cree Health Board, tel: 923-2332 ext. 355
Wally Rabbitskin, Program Officer in Physical Activity, Cree Health Board, tel: 923-2332, ext. 210
Bella Petawabano, Director of Awash Miyupimatsiiuun (children's health and well-being), Cree Health Board, tel: 923-2332, ext. 233

Background:

Major changes in the lifestyles of First Nations across North America have taken place. These changes have resulted in the appearance of diseases such as obesity, diabetes and heart disease. There is a possible connection between the diet and activity of children and obesity. In this study, we would like to find out what children are eating, how active they are, what they think about their bodies and themselves, and their body size. This study has been discussed with teachers at your child's school. The study is supported by Public Health Department, the Principal, and the Cree Board of Health and Social Services.

Purpose:

It is important to know if children are a healthy weight and if they feel good about their weight and themselves. It is also important to know the types of things that might cause a child to be too big or too small. For this reason, we would like to find out how active they are and what they are eating. This information can be used to develop programs and activities to keep kids a healthy size.

Procedures:

Diet: We will ask children about the foods they eat. They will be given a questionnaire during class and then will meet with a dietitian individually to go over what they eat. We might use an assistant fluent in Cree to help us. Children will be asked what they eat each day. Each child will be asked about three different days. The child will be asked how much food they ate, types of food, and method of preparation used. Children will be asked if they eat common foods.

What children think of their size and themselves: Your child will be shown pictures of children of different sizes, and they will be asked to select the one that looks the same size as them, the one they would like to look like, and the one they think might get diabetes. They will also be asked questions to try to understand what they think of themselves. The research team will give the questionnaires during class. Question will be read aloud so students understand the purpose of each question. Students will be told to spread themselves out around the classroom so that they are unable to see other students' responses and to choose the answer they think is the best response.

Size of children: To find out children's sizes, we will measure them (weight, height, and waist size) and find out how much fat is under their skin by measuring how thick it is. A member of the research team will measure your child's size. Skin folds will be measured at five on the body (back and front of the arm, on the back, on the hip, and the calf). Children will be required to lift up the back of their shirt and roll up their pant leg and sleeve. These measures will be taken in a private room with two testers present.

Activity and fitness: We will ask children how often they are active or inactive. We will ask children questions about the activity of people that they live with in their home. We will test how fit they are by asking them to run in the gym. We will ask children to attach to their clothing a small device called a pedometer that will measure how many steps they take in a day.

How Information will be used:

The information will be studied to find out if diet and activity levels are related to child size. It will also tell the researchers what children eat, if they are fit, and if they are happy with their bodies. The information may be compared to surveys in other parts of Canada and might be compared to future surveys. This information will be included as part of reports (theses) that university students will write, and will be used to write research papers that will be read by persons interested in child health.

Possible Benefits:

There is little information about what Cree children eat, what they think about the size of their bodies, what activities they do or if they are physically fit. There have been no studies of young children's diet, ideas of body image, self-esteem and levels of physical activity and fitness. The results from this study will help the community determine: (1) what children eat, (2) how they feel about their size, (3) if they have a proper weight and size, and (4) what activities children do. The information will help in the development of teaching materials and programs about healthy lifestyle and diet in the school.

Possible Risks:

The risks connected with participating in this study are minimal.

Confidentiality:

Your child's name will not appear in the computer and your child's name will never be reported. Personal records related to this study will be kept confidential. All files will be stored in a locked filing cabinet or on a private computer in the office of the researchers.

Time Commitment:

The entire test session should not exceed 3.5 hours per child in a 2-week period.

Withdrawal or non-participation in the study:

Children will be asked if they are willing to participate, and their wishes will be respected.

Children are free to withdraw from this study before or during the testing period.

If you have any questions, please contact:

Noreen Willows in Edmonton at (780) 492-3989 or by email: noreen.willows@ulberta.ca

Jane Blacksmith 923-3461 ext 205

Kitty Blacksmith 923-3461 ext 314

APPENDIX B: CONSENT FORM

CONSENT FORM

A study to understand the health of Cree children
Emiyuu Ayayaachiit Awaash Project (The Active Kids Project)

Purpose:
This research project hopes to find out from children:

(1) what they are eating,
(2) how they feel about their bodies and themselves,
(3) how active they are,
(4) if they have a healthy size.

Methods:

(1) What are they eating?
A researcher will ask your child what they have eaten on three different days, what foods they eat on a regular basis, and where they eat their meals. Pictures of some commonly eaten foods, plastic copies of food, and measuring cups and spoons will be used to help children tell the researcher how much food they ate.
(2) How do they feel about their bodies?
Pictures of children will be used to find out what your child thinks their body size is, what body size they want to be, and what is an acceptable and healthy body size. Your child will also be asked a series of questions about what they think of themselves.
(3) How much they exercise and are they physically fit?
Children will do a test of physical fitness by running in the gym and will be asked questions about their activities. They will wear a small device on their clothing that will count the number of steps that they take in a day.
(4) Their size
In a private booth, we will measure your child's height, weight and waist size. The thickness of the skin will be measured in five places on the body.

Confidentiality: All information collected on your child will be recorded on paper and entered into a computer. All of the information recorded and typed will be private and your child's name will not appear in any report. Only people that are working on this study will have access to the information. A copy of the data with all names removed will be stored at the Cree Board of Health and Social Services of James Bay.

Benefits: This study may not have any direct benefits for your child. It is hoped that this information can be used to make good decisions about health programs for children.

Risks: The information provided by your child will be kept private. It is not expected that participating in this study will harm your child.

Withdrawal from the study: You can decide that you do not want your child to participate in the study. This can be done before they have started the study or before the testing is completed.

Consent Form Emiyuu Ayayaachiit Awaash Project

Please read the attached information sheet and circle your answer.

Do you understand that you have been asked to include your son or daughter in a health research study?

Yes No

Have you read and received a copy of the information sheet?

Yes No

Do you understand that there are minimal risks involved in including your son or daughter in this research study?

Yes No

Do you understand that your son or daughter can quit taking part in this study at any time?

Yes No

Do you understand that the information collected will be kept confidential?

Yes No

Do you understand who will be able to access the information collected from this study?

Yes No

Do you understand that the information collected may be compared to results from similar surveys in other parts of Canada, and that the information may also be compared to future surveys or used for other research studies?

Yes No

Do you consent to have the information collected used as described in the information sheet?

Yes No

Do you consent to have the information used for future research studies?

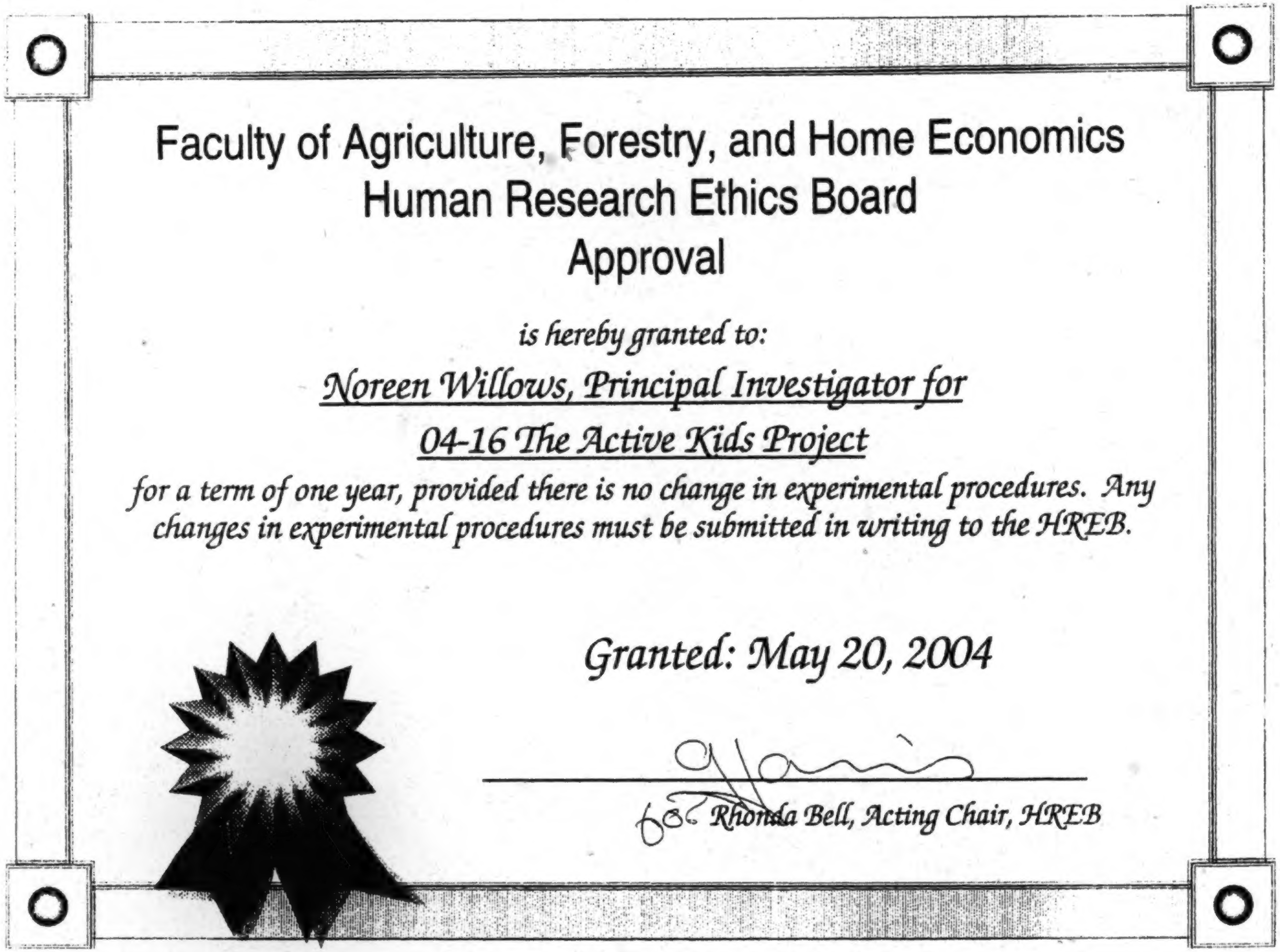
Yes No

Do you consent to having your son or daughter take part in this research study?

Yes No

Signature of parent or guardian	Printed name of parent or guardian
Date (dd/mm/yyyy)	Name of child

APPENDIX C: ETHICAL APPROVAL



Faculty of Agriculture, Forestry, and Home Economics
Human Research Ethics Board
Approval

is hereby granted to:

Noreen Willows, Principal Investigator for

04-16 The Active Kids Project

for a term of one year, provided there is no change in experimental procedures. Any changes in experimental procedures must be submitted in writing to the HREB.

Granted: May 20, 2004

for *Rhonda Bell, Acting Chair, HREB*

APPENDIX D: BODY IMAGE QUESTIONNAIRE

Note: Use of silhouettes approved from Pathways Steering Committee:

The Pathways Curriculum was created, published and copyrighted by the Pathways Cooperative Agreement.

The Pathways Curriculum was made possible by grants from the National Institutes of Health, the National Heart, Lung, and Blood Institute, grant numbers U01 HL50905, U01 HL50885, and U01 HL50907.

GIRL'S
BODY IMAGE QUESTIONNAIRE

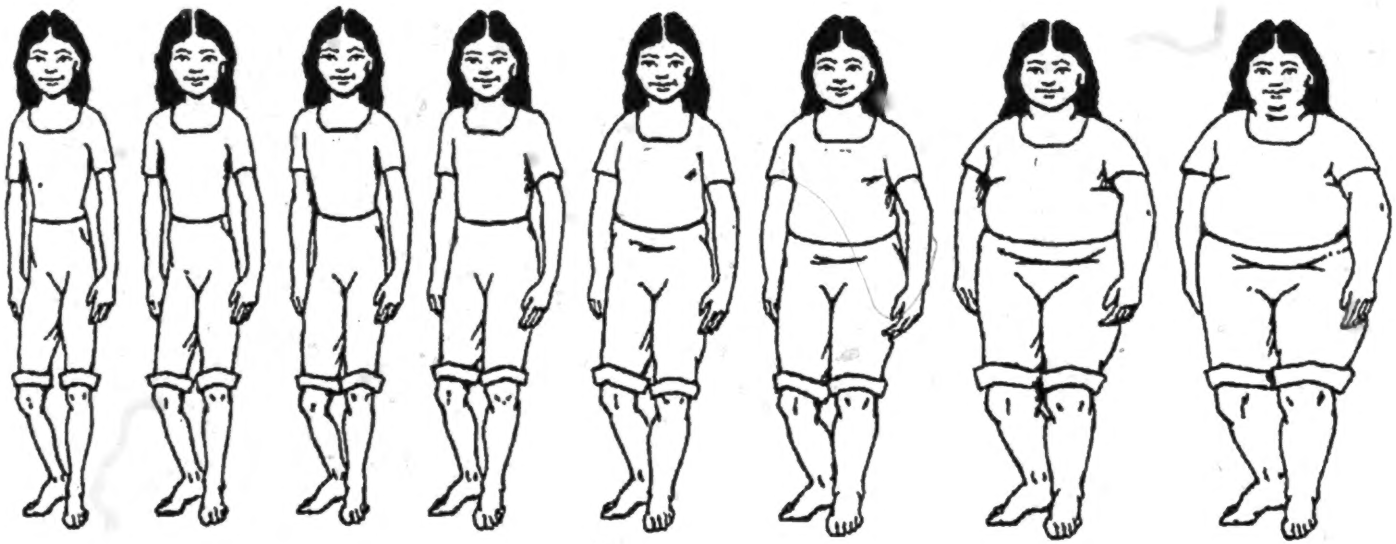
First Name:________________________________

Last Name:________________________________

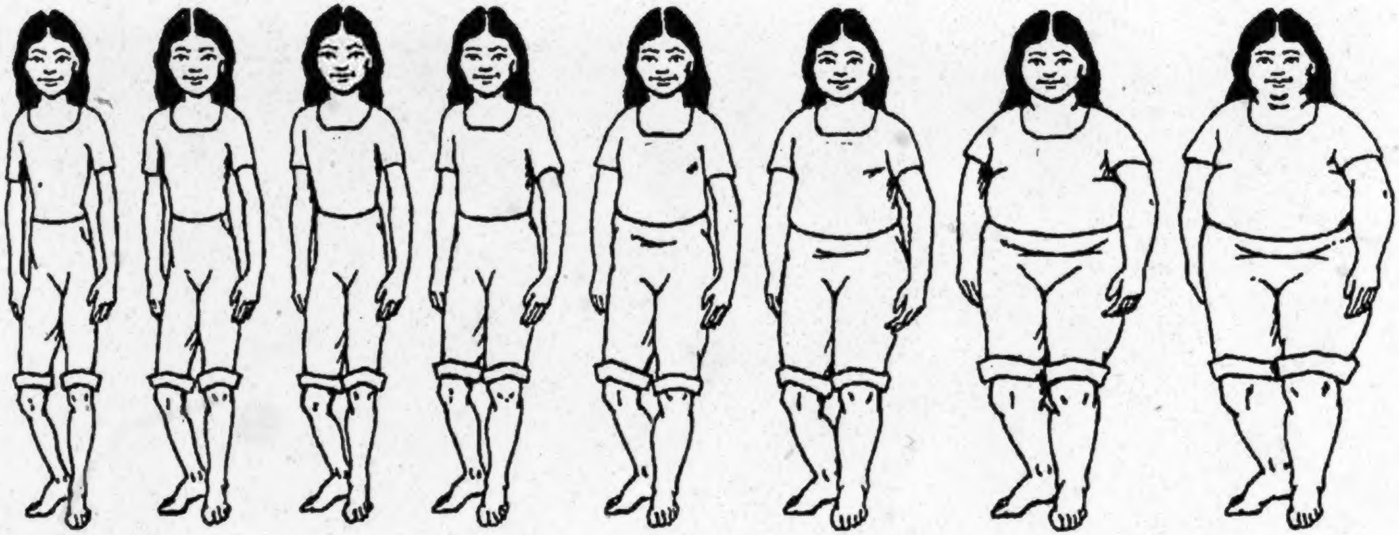
Homeroom Teacher:________________________________

ID# ____________

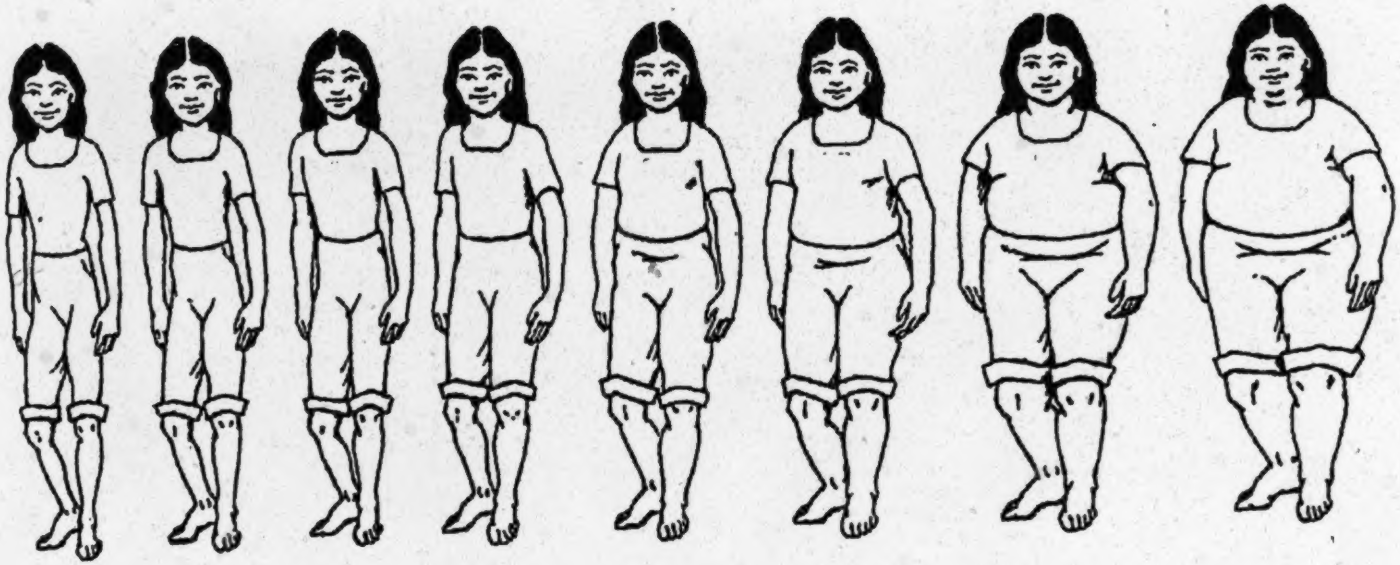
1. Circle the figure below who looks the most like you.



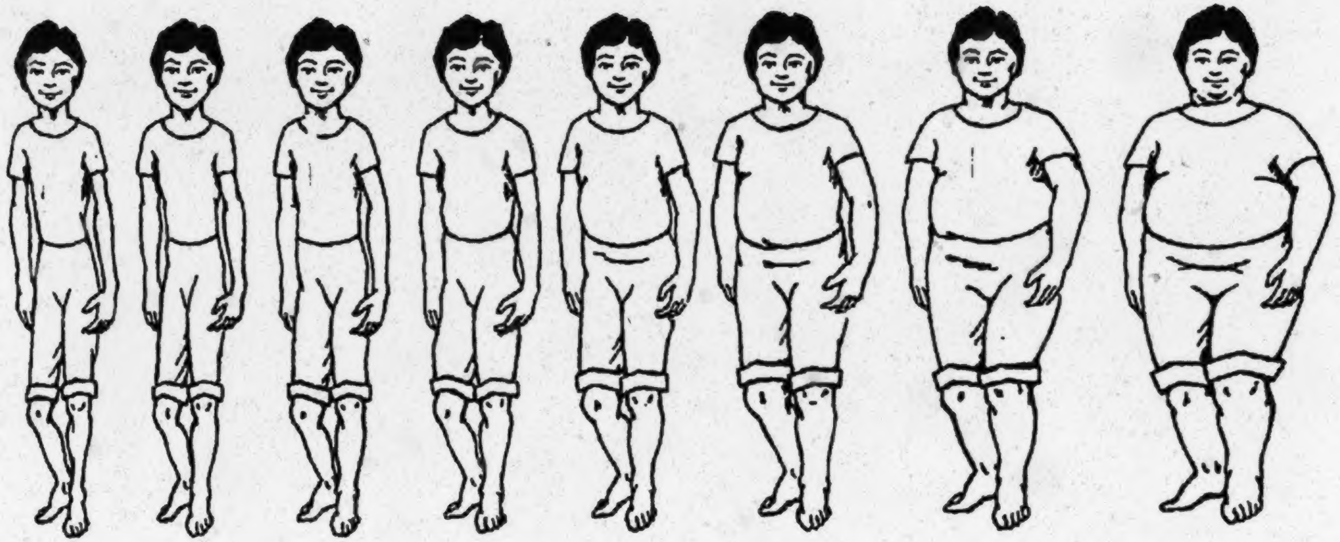
2. Circle the figure below who you want to look like.



3. Circle the girl who looks the best.



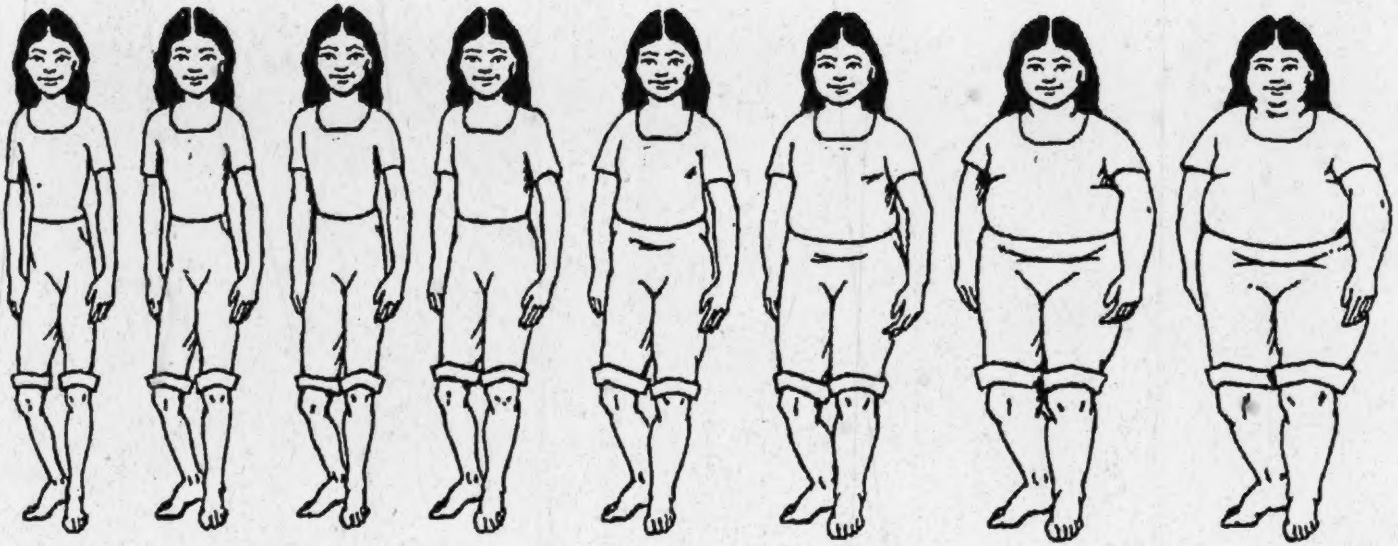
4. Circle the boy who looks the best.



5. **Do you know what diabetes is?**

Yes No

6. **Who might get diabetes when they grow up? Circle one.**



7. What do you think of your body size?

Too big Too small Just right

8. I like the way I look now.

Yes No

BOY'S
BODY IMAGE QUESTIONNAIRE

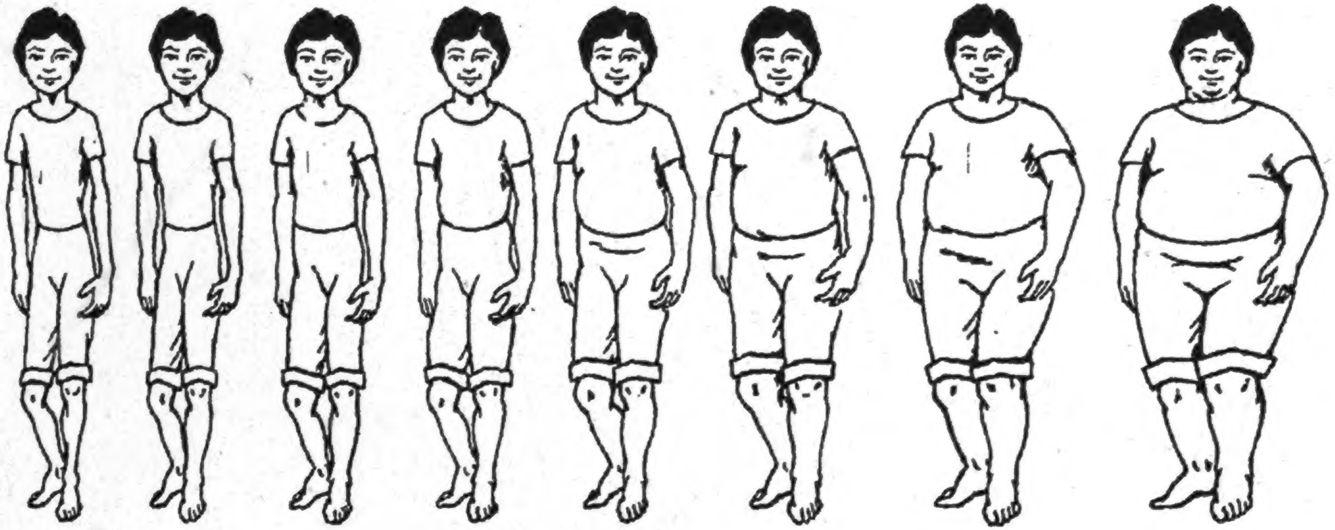
First Name:________________________________

Last Name:________________________________

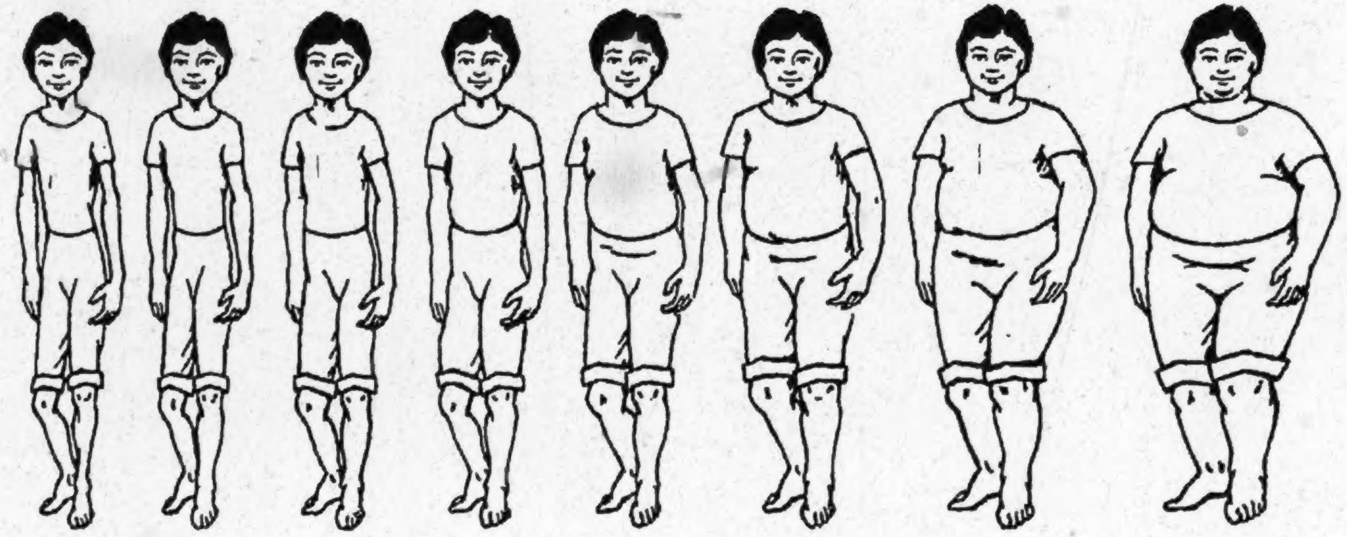
Homeroom Teacher:________________________________

ID# ____________

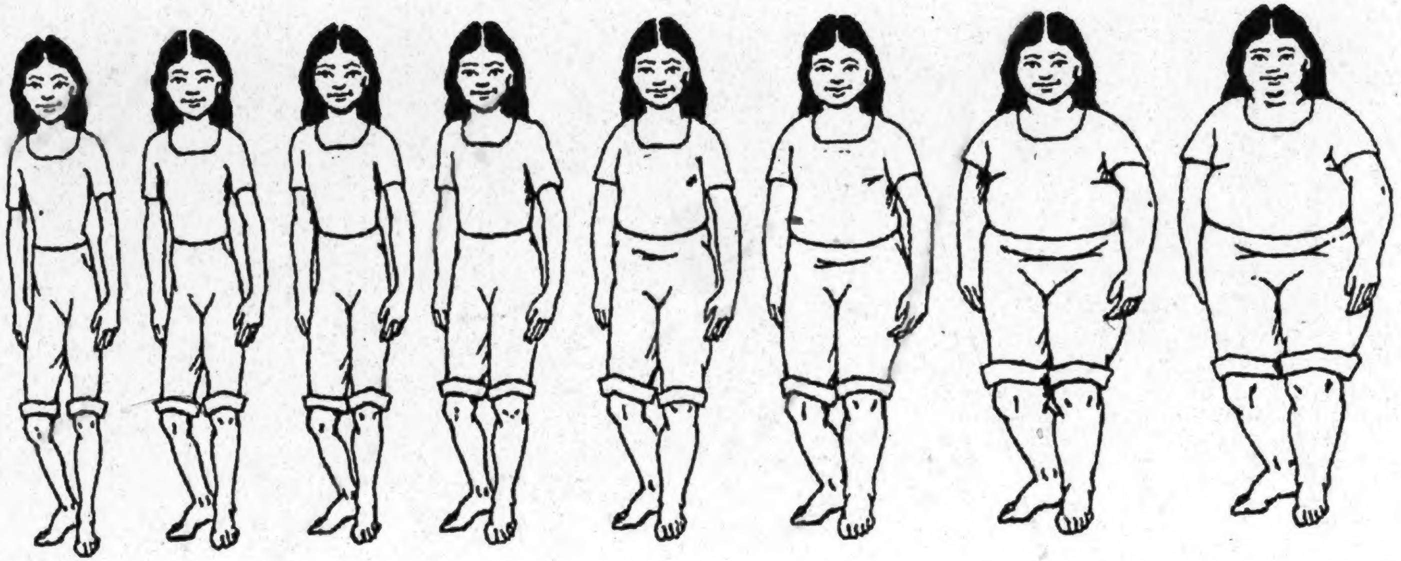
1. Circle the figure below who looks the most like you.



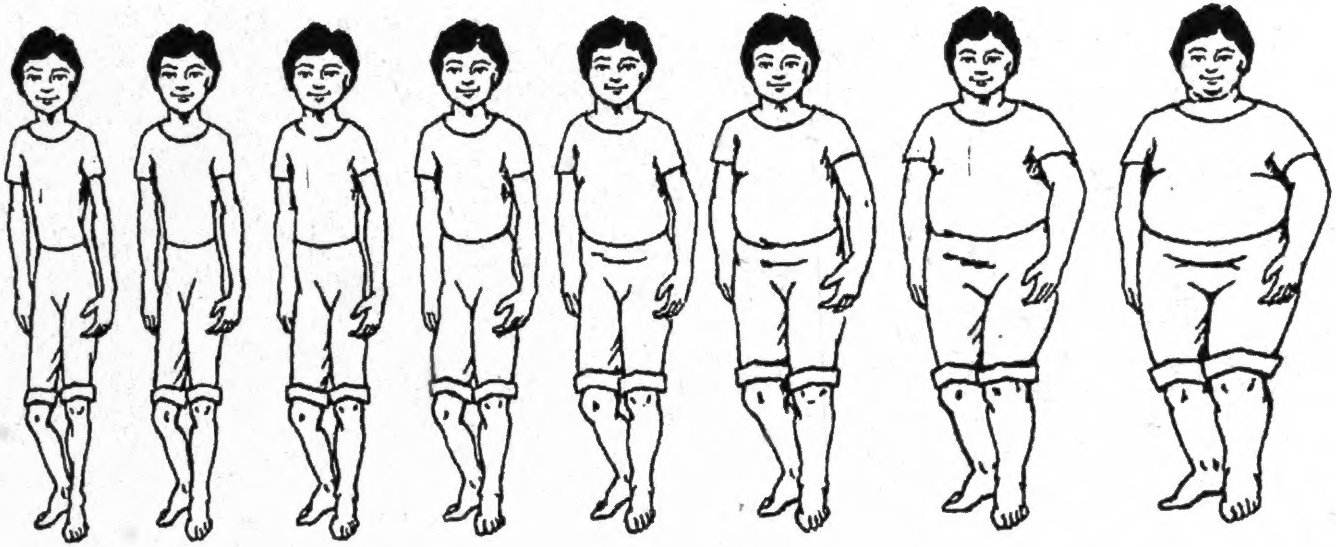
2. Circle the figure below who you want to look like.



3. Circle the girl who looks the best.



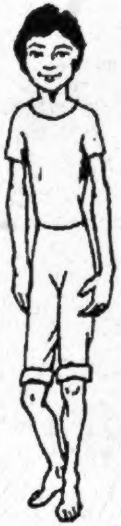
4. Circle the boy who looks the best.

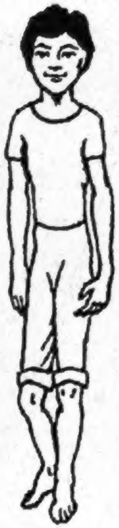


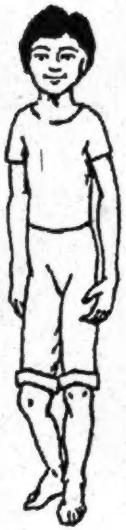
5. **Do you know what diabetes is?**

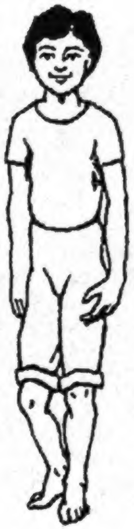
Yes No

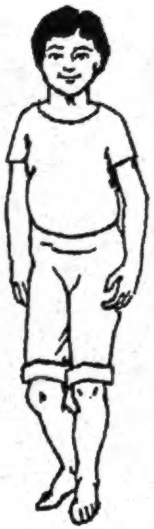
6. **Who might get diabetes when they grow up? Circle one.**

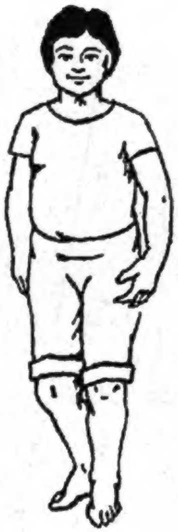


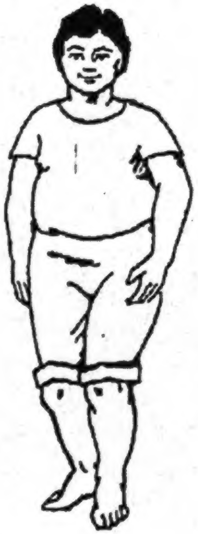


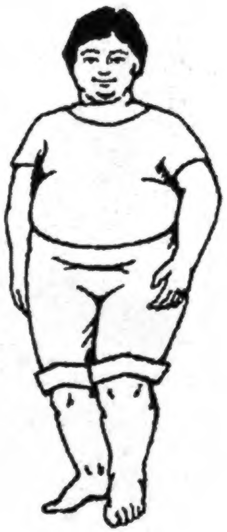












7. What do you think of your body size?

Too big Too small Just right

8. I like the way I look now.

Yes No

APPENDIX E: BODY IMAGE QUESTIONNAIRE NARRATIVE INSTRUCTIONS

BODY IMAGE & SELF CONCEPT QUESTIONNAIRES: ADMINISTRATION PROCEDURES

(1) Introduction.

Hi, my name is _______, and I am from the The Active Kids Project. During the project we are weighing and measuring you, asking questions about what you eat, and finding out how active you are. Today we will be asking you questions about your bodies, and how you feel about them. This is not a test and there are no wrong and right answers. The answers you give today will be not be shared with other students or your teacher.

(2) If there are two students, instruct students to sit in designated seats in the room so that they are unable to view other students' responses.

I will now ask that one person sit here (point to desk) and one person sit here (point to alternate desk).

(3) Provide each student with body image questionnaire, AND,

(4) Ask students to wait for administrator's cue to begin and to proceed with each question.

I am handing out the questionnaires now. Please fill out the top page with your name and home room teacher but do not start until I ask you to.

(5) Administer questionnaire.

Has everyone put their name and home room teacher on the top page? Great, now we will begin. We will be filling out questions from Part 1 as a class. I will read questions aloud, wait for everyone to finish answering, and then give you instructions to go on to the next question. Please flip the page.

- Question 1: Circle the figure below who looks the most like you. [Wait for everyone to respond]. Raise your hand if you need more time. [Wait if more time needed]. Please flip the page.
- Question 2: Circle the figure below who you want to look like. [Wait for everyone to respond]. Raise your hand if you need more time. [Wait if more time needed]. Please flip the page.
- Question 3: Circle the girl who looks the best. [Wait for everyone to respond]. Raise your hand if you need more time. [Wait if more time needed]. Please flip the page.

- Question 4: Circle the boy who looks the best. [Wait for everyone to respond]. Raise your hand if you need more time. [Wait if more time needed]. Please flip the page.
- Question 5: Do you know what diabetes is? Yes or No. [Wait if more time needed].
- Question 6: Who might get diabetes when they grow up? Circle one. [Wait for everyone to respond]. Raise your hand if you need more time. [Wait if more time needed]. Please flip the page.
- Question 6: What do you think of your body size? Please circle the answer. [Wait for everyone to respond]. Please raise your hand if you need more time. [Wait if more time needed]. Please flip the page.
- Question 7: I like the way I look now. Please circle the answer. [Wait for everyone to respond]. Raise your hand if you need more time. [Wait if more time needed]. Please flip the page.

Now we are finished Part 1. For Part 2, I will hand out another questionnaire (Piers-Harris Children's Self-Concept Scale). I will read the instructions aloud and then we will begin. [Read directions as per form]

[Read each question aloud and wait for students to respond before moving on].

(6) Collect questionnaires.
(7) Once students have left the testing room, rate each child's body size on the Rater's sheet.

APPENDIX F: VISUAL ADIPOSITY RATING

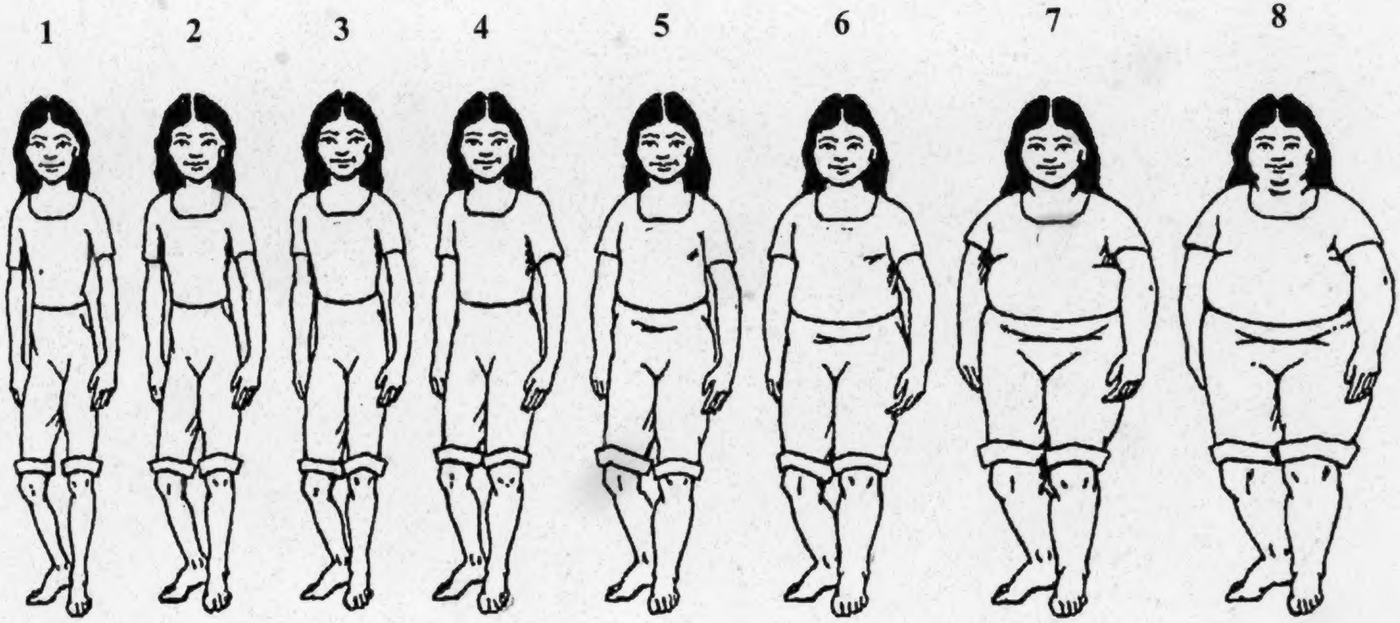
Note: Use of silhouettes approved from Pathways Steering Committee:

The Pathways Curriculum was created, published and copyrighted by the Pathways Cooperative Agreement.

The Pathways Curriculum was made possible by grants from the National Institutes of Health, the National Heart, Lung, and Blood Institute, grant numbers U01 HL50905, U01 HL50885, and U01 HL50907.

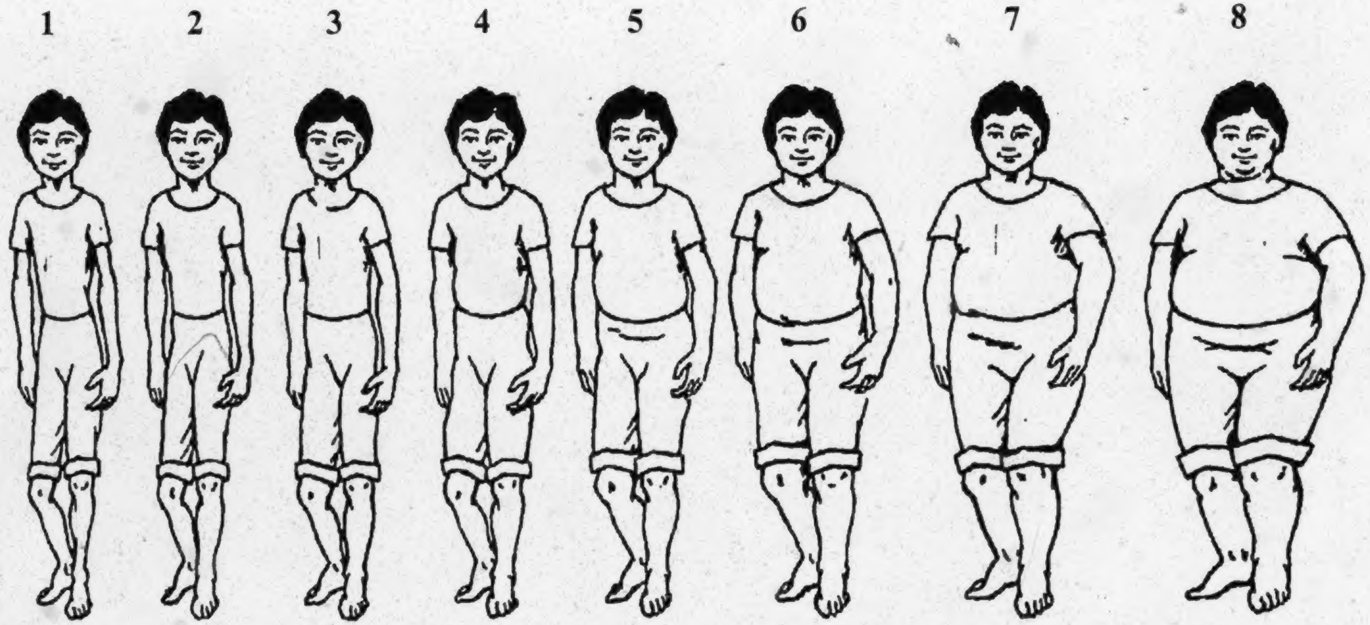
Rater: ______________________________ Student's Name: ___________________________________

ID# _____________



Rater: ______________________________ **Student's Name:** ___________________________________

ID# _____________



APPENDIX G: PIERS-HARRIS CHILDREN'S SELF-CONCEPT SCALE NARRATIVE INSTRUCTIONS

Here are some sentences that tell how some people feel about themselves. Read each sentence and decide whether it tells the way you feel about yourself. If it is *true* or *mostly true* for you, circle the word *yes* next to the statement. If it is *false* or *mostly false* for you, circle the word *no*. Answer every question, even if some are hard to decide. Do not circle both yes and no for the same sentence. If you want to change your answer, cross it out with an X and circle your new answer.

Remember that there are no right or wrong answers. Only you can tell us how you feel about yourself, so we hope you will mark each sentence the way you really feel inside.

[From the Piers-Harris Children's Self-Concept Scale, Second Edition, 2003]